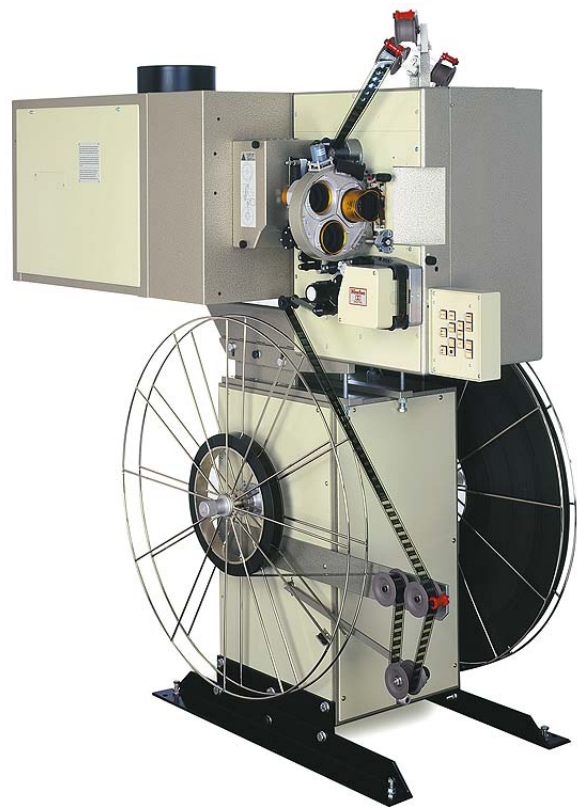


# Operating Manual

FP 25 D Projector



DIGITAL CINEMA  
**FILM TECHNOLOGY**  
STUDIO TECHNOLOGY  
CUSTOMIZED SOLUTIONS  
360° DISPLAY SYSTEMS



## **Preface**

Dear customer,

this operating manual will help you get acquainted with the projector and to make use of its possible applications in accordance with the requirements.

This operating manual includes important hints for a safe, proper, correct and economic operation.

It will also help you to avoid danger, to reduce failures and to increase life and reliability of the projector.

This operating manual includes useful hints for proprietor and personnel obligations. It does not substitute, but supports, a thorough training period.

We confirm that the information given in this manual is true and correct to the best of our knowledge and belief. However, notwithstanding all best care and attention, technical inaccuracies and typographical errors cannot be fully excluded.

As far as we did not assure explicitly and written form any special characteristics and suitability of a product for a certain intended purpose, the statement in this manual are generally without obligation.

All descriptions, illustrations and technical data comply with the technical status of the product at the date of printing of this manual. Any modifications are subject to change without prior notice due to ongoing further development.

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### **Imprint**

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### **Hints / Own Notes**

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# **1 Safety**

## **1.1 Safety Notes**

### **1.1.1 General Hints**

- » Read this operating manual before operating the projector.
- » This operating manual is to be kept with the projector at all times.
- » For safe and trouble free operation of the projector a good working knowledge of basic safety regulations and the projector's correct use is required.
- » This operating manual contains the most important instructions for running the projector safely.
- » This operating manual must be read and understood by all persons working with the projector, with particular emphasis on all aspects regarding safety.
- » In addition, all valid regulations and measures concerning accident prevention must be observed.
- » The owner is responsible to assure that all persons who work with and / or operate the projector are familiar with safe operating practices and accident prevention techniques and have a complete working knowledge of the projector and all additional machines and components of the system.
- » Those persons who work with the projector are responsible:
  - to observe safe operating practices and accident prevention techniques
  - to have read and fully understand the safety chapter and the warnings within this operating manual.
- » The place on which the projector will be installed must be even, solid and clean.
- » Installation and basic adjustment must always be carried out by trained service personnel.

### **1.1.2 Dangers when Working with the Projector**

Projectors are constructed according to the latest engineering and state-of-the art safety standards. The projector is only to be used for its intended purpose and is only used when functioning absolutely perfectly.

Serious danger may result from improper use of the projector, causing injury to the user or a third person, or damage may be done to the projector or other items in the vicinity.

Faults that could adversely affect safety must be rectified immediately.

The projector must not be used until any faults are rectified.

### **1.1.3 Intended Purpose**

The projector is suitable to reproduce 35 mm film images and sound.

Any other or further use is not classified as an “intended purpose”. KINOTON cannot be held liable for any damage resulting from different or extended operation.

As part of the “intended purpose” these tasks must be performed:

- » Observing all instructions and warnings contained in this manual
- » Inspecting the equipment for damage and correct function
- » Implementation of maintenance and repair work.

### **1.1.4 Guarantee and Liability**

By reference KINOTON’s “General Terms of Business” apply. They are available to the customer on conclusion of sale at the latest.

Guarantee and liability claims for damage to persons and property are invalid if due to one of the following causes:

- » Improper use of the projector
- » Improper assembly, commissioning, operating and maintenance of the projector
- » Operation the projector with defective and / or non-functioning safety and protection devices
- » Activating the lamphouse via the rectifier and not via the projector
- » Disregarding of the instructions in the manual concerning transportation, storage, assembly, commissioning, operation and maintenance
- » Modification of the projector without written authorisation from the manufacturer
- » Connecting to power other than as specified
- » Failure to monitor and/or replace parts subject to wear and tear
- » Improper repairs
- » Emergencies due to influence from outside bodies or force majeure.

## 1.2 Explanations of Symbols and Notes

Throughout this manual you will find the following symbols:



### **DANGER**

This symbol indicates an imminent threat of danger to life and personal health. Disregarding this warning can result in serious personal injuries or highly dangerous injuries.



### **WARNING UV RADIATION**

This symbol warns from UV radiation and that eye and skin protection during installation and servicing must be put on.



### **ATTENTION**

This symbol indicates a possibly dangerous situation. Disregarding this warning can result in small personal injuries or damage to projector.



### **NOTE**

This symbol indicates where notes, user tips and useful information can be found. They serve to help use the projector to its fullest.



Always wear **face protection** when changing the xenon lamp.



Always wear **protection gloves** when changing the xenon lamp.



Always wear **protection jacket (Kevlar)** when changing the xenon lamp..

## 1.3 Special Hazard Points

### 1.3.1 Electric Power Hazards



#### **DANGER**

- ▲ The access to power supply must always be kept closed. Only authorized service personnel may access this area.
- ▲ Installation according to the local electrical code and regulations and work on the electrical supply conductors or circuits must only be done by qualified technical personnel.
- ▲ This projector should be operated from an AC power source. Ensure that the mains voltage and capacity matches the projector electrical ratings. Do not defeat the purpose of the grounding.
- ▲ Do not allow anything to rest on the power cable and do not locate the projector where persons will walk on the cable.
- ▲ Do not operate the projector with a damaged cable or if the projector has been dropped or damaged - until it has been checked for operation by a qualified service technician.
- ▲ Position the cable so that it will not be tripped over, pulled, or contact hot surfaces.
- ▲ If an extension cable is necessary, a cable with a current rating at least equal to that of the projector should be used to avoid overheating of the cable.
- ▲ Do not use an accessory attachment which is not recommended by the manufacturer.
- ▲ The rectifier must be exclusively enabled from projector only.
- ▲ The 4060 DC ignition unit is directly supplied via the rectifier. Therefore the lamp can be ignited by switching on the rectifier itself. Igniting the lamp by switching on the rectifier at open lamphouse can cause serious injuries and damages to the lamphouse and projector.
- ▲ The safety devices in the lamphouse (door switches and air flow switch) must not be deactivated. Safe service work on open lamphouse is possible with functional safety devices only, because rectifier and mains power will be switched off.

### 1.3.2 Lamphouse Hazards

#### 1.3.2.1 Broken Glass

In cold condition the xenon lamp has an inner pressure of about 8 to 10 bar (145 psi) and in hot condition of about 30 bar (435 psi). When a xenon lamp bursts, broken glass can cause suffer injury to face, eyes and arteries. Therefore it is absolutely necessary to wear protection with open lamphouse.



##### **DANGER OF EXPLOSION**

- ▲ Never bypass a door switch.
- ▲ Only work on open lamphouse and with xenon bulb with face protection (shield), neck protection and safety gloves which reach to the elbow.  
If the xenon lamp explodes you can suffer injury to face, eyes and arteries.
- ▲ Dispose of the xenon bulb: Before removing xenon lamp put protective cover around it, pack xenon bulb in original package and give it back to your supplier.
- ▲ Only insert the new xenon bulb in protective cover. Remove cover after mounting the xenon bulb.

#### 1.3.2.2 UV Radiation



##### **WARNING UV RADIATION**

- ▲ Operate projector with a closed lamphouse only.
- ▲ Use UV radiation eye and skin protection during adjustment of the lamp and convergence.
- ▲ If you do some adjustments with an open lamphouse (look through visual hole), you have to use visual protection which blocks the ultraviolet radiation.  
**Never look into light of a xenon lamp without protective glasses!**

#### 1.3.2.3 High Voltage



##### **DANGER**

Ignite xenon lamp in closed lamphouse only.

### 1.3.3 Mechanical Danger



##### **DANGER**

- ▲ Do not work around the machine with long loose hair, or loose clothing such as scarves or ties, they may get trapped in the drive mechanism and pull you in.
- ▲ Only open shutter housing when projector is standing still with power disconnected. If the projector is running with covers open be careful and do not touch the rotating shutter or other moving parts. Serious cuts can result.
- ▲ Do not put your fingers between the film track and film pressure skate or between sprockets and pad shoes.

## 1.4 Preventing Projector Damage



### ATTENTION

- △ Always switch off main switch, before **cleaning** the projector housing. To keep the cabinet looking brand-new, periodically clean it with a soft cloth. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution. Never use strong solvents, such as thinner or benzine or abrasive cleaners, since these will damage the cabinet surface.
- △ To ensure the highest optical performance and resolution, the projector lenses are specially treated with an anti-reflective coating. Therefore, avoid touching the coated lens surface.  
To remove dust on the lens, use a soft dry cloth (Cleaning set from Kinoton).  
Do not use a damp cloth, detergent solutions or thinner.

## 1.5 Service



### ATTENTION

- △ Do not attempt to **service** this projector yourself. Refer all projector servicing to a qualified Kinoton service center.
- △ When replacement parts are required, be sure the service technician has used **original replacement parts** or authorized replacement parts which have the same characteristics as the original parts. Unauthorized substitutions may result in degraded performance and reliability, fire, electric shock or others hazards. Unauthorized substitutions may void warranty.
- △ Upon completion of any service or repairs to this projector, ask the service technician to **perform safety checks** to determine that the projector is in proper operation condition.
- △ Xenon compact arc lamps are under high pressure. The lamp must be handled with great care. They may explode if dropped or mishandled. Whenever the protective cover is removed from the lamp, authorized protective clothing must be worn.

## Copyright

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This manual is intended for the user and its staff only.

It contains regulations and operating notes that must not be copied, reproduced or otherwise transmitted, in whole or in part.

Infringement of copyright laws may lead to prosecution. Due to ongoing development, design details, features and specifications are subject to change without notice.

## **1.6 Protective Devices**

All existing safety devices must be checked regularly

### **1.6.1 Main Switch**

In case of an emergency, you can switch off the projector using the main switch (under the projector door). Push the switch to position "0". The red lamp in the switch turns off.

### **1.6.2 IR Reflex Film Break Sensor**

The film break sensor (arrow) switches off the projector when no film is passing the sensor (e. g. at a film break). In this case the projector will be stopped.



#### **► NOTE**

If your projector is equipped with an automation system the film break sensor can trigger a run of events.

### **1.6.3 Film Stripper**



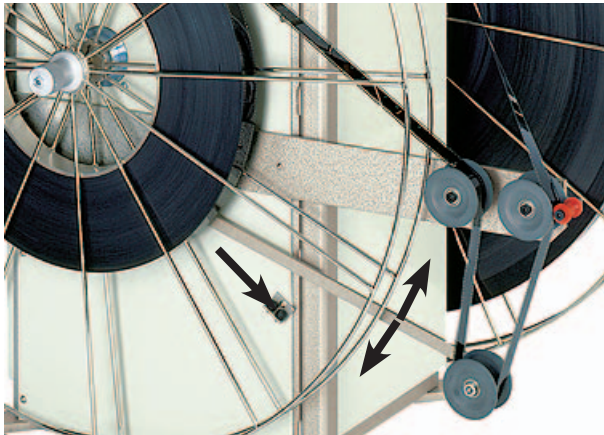
The film stripper (arrow) prevents film from winding around the sprocket after a film break or loss of a tape fixing has happened.

Film strippers are attached to all sprockets.

#### 1.6.4 Spool Tower Film Break Switch

If the lever arm moves from the working position (arrows on lever arm) to the limit stop position (arrow), the spool drive will be reduced until the spool comes to a standstill.

In the event of a film break the lever arm moves to the limit stop position (arrow).



#### 1.6.5 Lamphouse Door Switch

On both sides door switches (arrows) are mounted in the lamphouse frame. The xenon lamp only ignites when both lamphouse side doors are closed.



#### ATTENTION

Never activate the lamphouse via the rectifier.

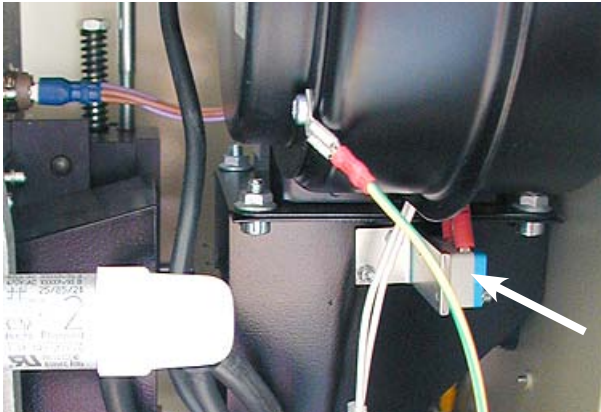


### 1.6.6 Lamphouse Airflow Switch

As soon as the projector is switched on, the radial blower starts the operation. It is reasonable to cool the xenon bulb directly.

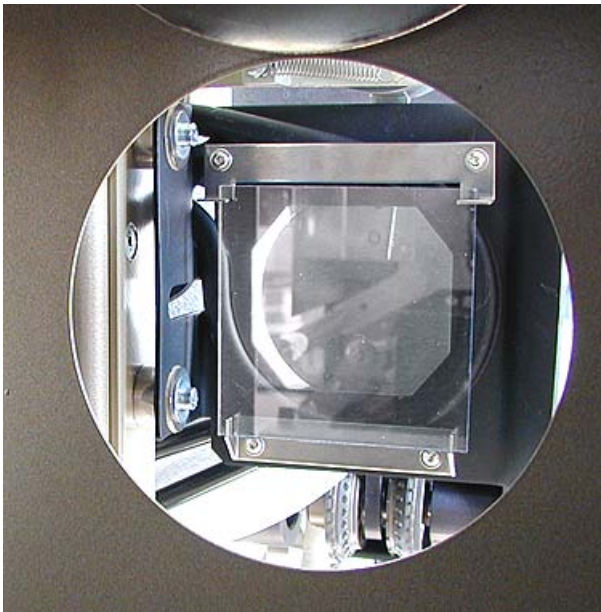
If the air flow is interrupted, the xenon lamp will be switched off by the airflow switch (arrow).

If the projector and the xenon lamp are switched off, the blower should run after about ten minutes.



### 1.6.7 Heat Filter

Lamp power more than 2500 W needs a heat filter which has to be mounted in the lamphouse or in the projector's film gate (see figure).



Lamphouses with metallic mirrors and all big lamphouses (4,000 - 7,000 W lamp power) are equipped with a heat filter (200 x 200 mm).

The small lamphouse (700 - 3500 W lamp power) has no heat filter. But if necessary, a heat filter (78 x 78 mm) can be inserted in the film gate.



## 2 Transportation and Installation / Mounting

### 2.1 Transportation

- » The projector is completely (with mounted lamphouse (up to 2000 W), without lamp-house (2000 W - 7000 W) mounted on a pallet and secured with screws.
- » With delivery to countries over-seas the projector secured on the pallet is packed in a wooden crate.
- » The accessories are packed into a box or into the wooden crate too.
- » Weight (gross): about 350 kg (771,6 lb)

#### Storage

If the projector is stored for a longer time:

- » Only store in dry rooms.
- » Choose a suitable protective cover or leave projector in the original cover.

#### ► NOTE

Although most parts are delivered with a protective cover, you have to clean the projector and its components before the first start.

### 2.2 Delivery or Equipment Variations

- » Projector FP 25 D
  - with SPT 4000 Spool Tower
  - with SPT 5000 Spool Tower
  - with UG 4000 Spool Rack
    - with 1 friction drive (standard)
    - with 2 friction drives for rewinding (option)
  - with UG 5000 Spool Rack
    - with 1 friction drive (standard)
    - with 2 friction drives for rewinding (option)
- » Lamphouse
  - up to 2000 W
  - up to 7000 W
- » Reverse-scan sound device
  - only analog, not upgradeable to Dolby Digital
  - optical stereo analog, upgradeable to Dolby Digital
  - optical stereo analog and Dolby Digital (option)
- » Lens holder
  - electronic focusing control (option)

- » Lens turret (option)
  - 2 lenses and manual lens change
  - 2 lenses and automatic lens and aperture change
    - electronic focusing control (option)
  - 3 lenses and manual lens change
  - 3 lenses automatic lens and aperture change
    - electronic focusing control (option)
- » Remote unit
  - focusing control (option)
  - framing control (option)
- » Film gate cooling unit (option)
- » Water cooling system (from 4000 W lamp capacity on)
- » Automation system (option)
  - DMP 1 Digital Matrix Programmer
  - CCA3 Cue Code Automation
  - SA2 Sequence Cinema Automation
  - EMK 1 Electronic Automation System
- » Pedestals
- » Reader for DOLBY / DTS / SDDS (option)
- » Control panel BWR (option)
- » Auditorium control panel (option)
- » Film cleaner (option)
- » Operating manuals

## 2.3 Installation



### ATTENTION

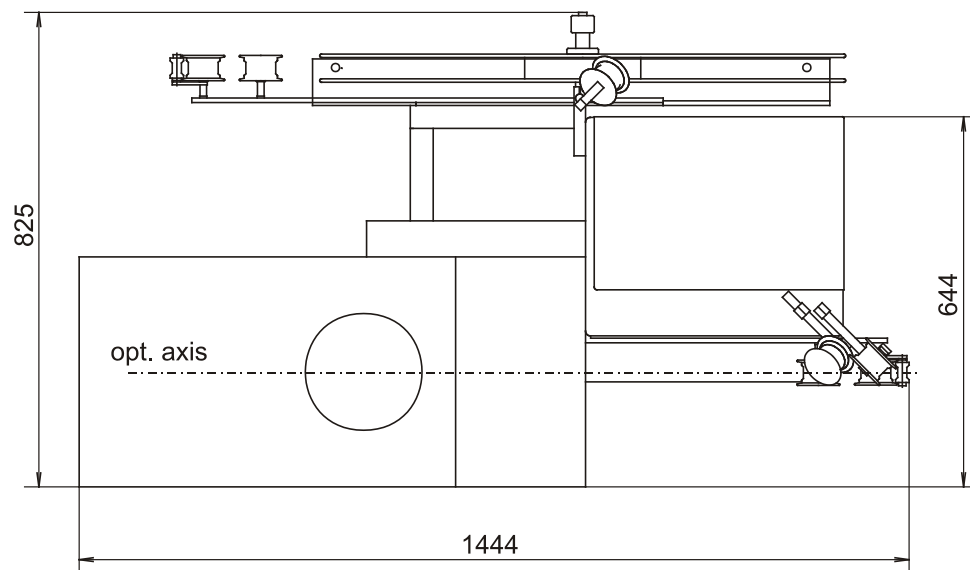
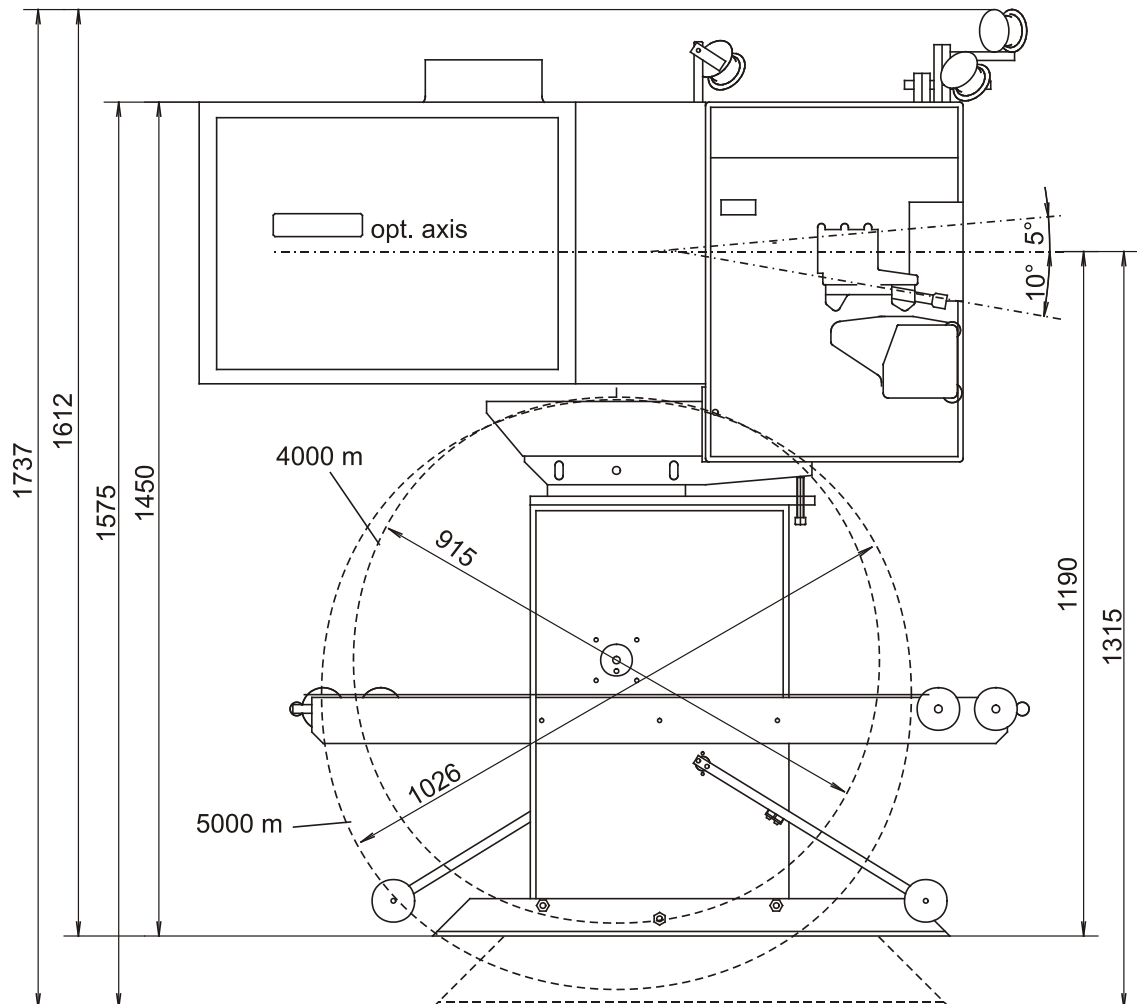
- △ The projector will be delivered completely wired and factory tested.
- △ Only use suitable hoisting machines (crane, fork-lift).
- △ Do not use unit parts as climbing aid.
- △ The electrical connections have to be in accordance with local regulations and be installed professionally.
- △ All installation should only be carried out by Kinoton service.

### 2.3.1 Place of Installation, Place of Operation

- » The place on which the unit will be installed must be even, solid and clean.
- » The figure on the next page shows the projector's dimensions.
- » Requirements of the projection room:
  - humidity: 40 to 60 %
  - temperature: 15 to 25° C
  - maximum sea level: 2000 m

## 2.3.2 Important Hints for Installation

### Projector Dimensions



### 2.3.3 Additional Installation Hints

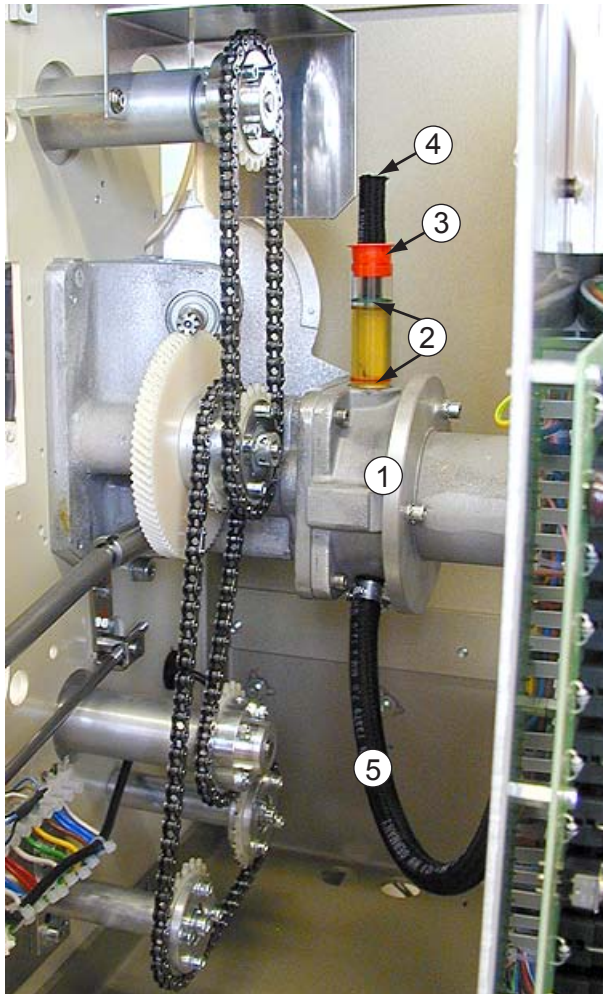


#### ATTENTION

- △ The 16<sup>2</sup> PE lines have to be high-flexible to derive the high-frequency ignition voltage.
- △ Do not use the wires in the lamphouse cable to connect the additional dowser. Lay the dowser connection in the lamphouse tube as short as possible.
- △ If you install an old building projector remove all not used old cables, wires and lines under the projector.
- △ If possible the heat exchanger must not have more than 10 m distance to the projector and the refrigerating set must not have more than 15 m distance to the heat exchanger. If the environment temperature is high and the wires are long, the hose is to be isolated because of condensation.
- △ The cooling water temperature has to be more than 15° C, to avoid a precipitation of condensed water on the film gate and the front gate.

## 2.4 Mounting

### 2.4.1 Filling with Oil



#### ► NOTE

Use only Kinoton type 3672 oil.

- ① Intermittent movement (Maltese cross)
- ② Oil gauge glass with oil level rings (red and green)
- ③ Oil gauge cap
- ④ Vent hose
- ⑤ Waste oil hose

#### Procedure to fill with oil

- Open the projector head housing.
- Remove the oil gauge cap ③. If there is not a small vent hole in the cap, pierce it with a pin.
- Add oil through the hose using a funnel or squeeze container. The oil level must be between the red and green rings ②.
- While filling, turn the mechanism slowly, by hand, so that any air bubbles can escape. Turn the framing knob between the left and right stops several times to distribute the oil. If necessary add more oil.
- Put on the cap on the oil gauge and hang the hose back in the clip. Do not put the shipping cap on the hose; throw it away.

#### ► NOTE

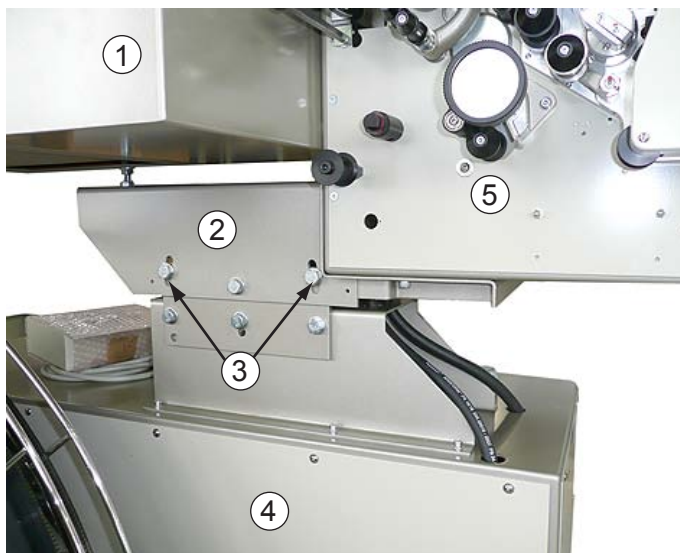
- ▷ The quantity of oil to fill the movement is about 6.8 fl. oz (200 ml).
- ▷ Do not overfill the intermittent.

## 2.4.2 Installing and Connecting the Lamphouse Components

### ► NOTE

- ▷ Connecting the lamphouse should be carried out by service personnel.
- ▷ The installation and adjustment of the xenon bulb and the adjustment of the intensity of currents is described in chapter 6.4.14 and further on.
- ▷ The mirror should only be installed and adjusted by trained service personnel. The reflector should only be changed and adjusted roughly by the projectionist in case of need, therefore see chapter 6.4.18.
- ▷ Installing the heat filter is described in chapter 6.4.19.
- ▷ You will find the lamphouse connecting plan in chapter 8.3.3.

## 2.4.3 Adjusting the Projector Inclining



① Lamphouse

② Inclining table

③ Hexagon head screws in long holes

④ Spool tower / spool rack

⑤ Projector head

- Slightly loosen the 4 screws ③ on the inclining table ② (2 on the front side and 2 on the backside). The projector head ⑤ with the lamphouse will tilt against the bottom, because the gravity centre is lying in front of the inclining axis.
- Adjust the projector head to the desired position and fix the inclining table by fastening all four screws ③ (maximum tilting angle: 10° to the bottom, 5° to the top).



## 2.4.4 Connecting the Water Cooling (option)



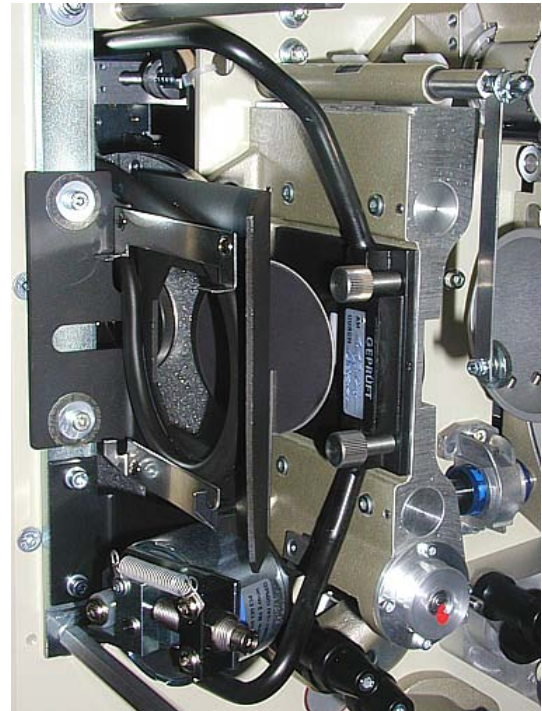
### ATTENTION

- △ A water flow of 2 to 3 l/min is needed to get a water temperature of  $18^{\circ}\text{C} \pm 2^{\circ}\text{C}$  ( $64^{\circ}\text{F} \pm 10^{\circ}\text{F}$ ).
- △ The water temperature should not be less than  $16^{\circ}\text{C}$ , otherwise water can condense on pipes, cables and film running components and finally results in damage of the film material. At bad conditions dropping water can damage the electronics.
- △ If possible the heat exchanger must not have more than 10 m distance to projector and refrigerating set must not have more than 15 m distance to heat exchanger. If environment temperature is high and wires are long, the hose is to be isolated because of condensation water.
- △ At bad climatic conditions (high temperature, high humidity) condensation can also occur above  $16^{\circ}\text{C}$  - in this case please check the projector.

- Connect the inlet and outlet tubes of the water cooling system to the connecting pieces in the projector.

### ► NOTE

You will find the description of the water cooling unit in the corresponding operating manual.



## 2.5 Connecting the Projector



### ATTENTION

Connecting the projector should only be carried out by electricians or service personnel!

- The projector is connected to mains current via the terminal strip in the spool tower or the spool rack.

### ► NOTE

- ▷ You will find plans of terminal connection in.
- ▷ You will find a wiring scheme in and 8.3.1.



## 3 Function and Components

### 3.1 Components Overview

#### 3.1.1 Projection Drive

The FP 25 D projector (a combination of a **projector head** and a **spool tower** or a **spool rack**) is suitable to reproduce 35 mm films and sound formats in small, medium, large cinemas, open air events and concerts.

#### 3.1.2 Projector Head

- » The film is transported through projector from the top to the bottom: from the rear film spool via projector head to projection to the forward film spool.
- » A lamphouse (2 types) is mounted onto the projector head.
- » The reverse-scan sound device is mounted on projector head and is suitable to reproduce analog sound and digital sound DOLBY SR·D. Both sound formats in shape of readers can be combined in one equipment.
- » The projector can be equipped with DTS or SDDS reader (Sony). Both readers can be fastened on an extension arm at the top of the projector head.

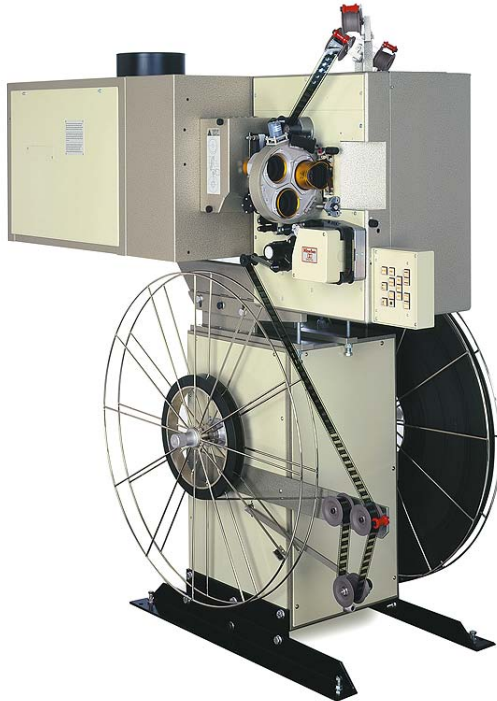
#### 3.1.3 Spool Tower

- » The spool tower is mounted on an inclining table under the projector head.
- » In combination with the spool tower the projected film will be transported from the rear side film spool to the fore side film spool.
- » The spool tower can be equipped with film spools up to 5000 m.  
To operate with 5000 m spools you need adapter plates to raise the spool tower.
- » With the spool tower the film can be rewound, made up and teared down at a maximum speed of about 256 m/min.
- » To have a constant film tension at each film reel diameter the friction motors are electronically controlled.
- » By lever arms the winding speed will be controlled corresponding to the reel diameter.

#### 3.1.4 Spool Rack

- » The spool rack is mounted on an inclining table under the projector head.
- » In combination with the spool rack the projected film will be transported from the rear side to the fore side film spool.
- » The spool rack can be equipped with film spools up to 5000 m.  
To operate with 5000 m spools you need adapter plates to raise the spool rack.
- » Normally only the take-up friction is driven electronically controlled - the take-off friction works passive mechanically.
- » Optionally the projector can be equipped with two electronically controlled friction drives to make rewinding possible (max. speed = 100 m/min).

### 3.1.5 Projector Variations with Spool Tower



### with Spool Rack



### 3.1.6 Projector Head



- ① Projector head
- ② Guide rollers
- ③ Lamphouse
- ④ Shutter housing,  
film gate with:  
film pressure skate  
intermittent sprocket
- ⑤ Feed sprocket
- ⑥ Lens turret (option)
- ⑦ Bottom / holdback sprocket
- ⑧ Reverse-scan sound device
- ⑨ Spool tower or spool rack

### 3.2 Film Gate and Film Track

In the film gate the film is positioned precisely. By adjusting the film pressure skate you can optimize the picture steadiness.

After threading the film, close the film track with the film pressure skate to guide the film. The four ceramic rollers guide the film laterally.



- ① Shutter housing
- ② Film gate
- ③ Film runner strips (2)
- ④ Ceramics roller (4)
- ⑤ Film pressure skate
- ⑥ Intermittent sprocket
- ⑦ Aperture changer (option)

#### 3.2.1 Film Pressure Skate

For smooth and silent film running it is very important that the pressure of the film skate is adjusted accurately.

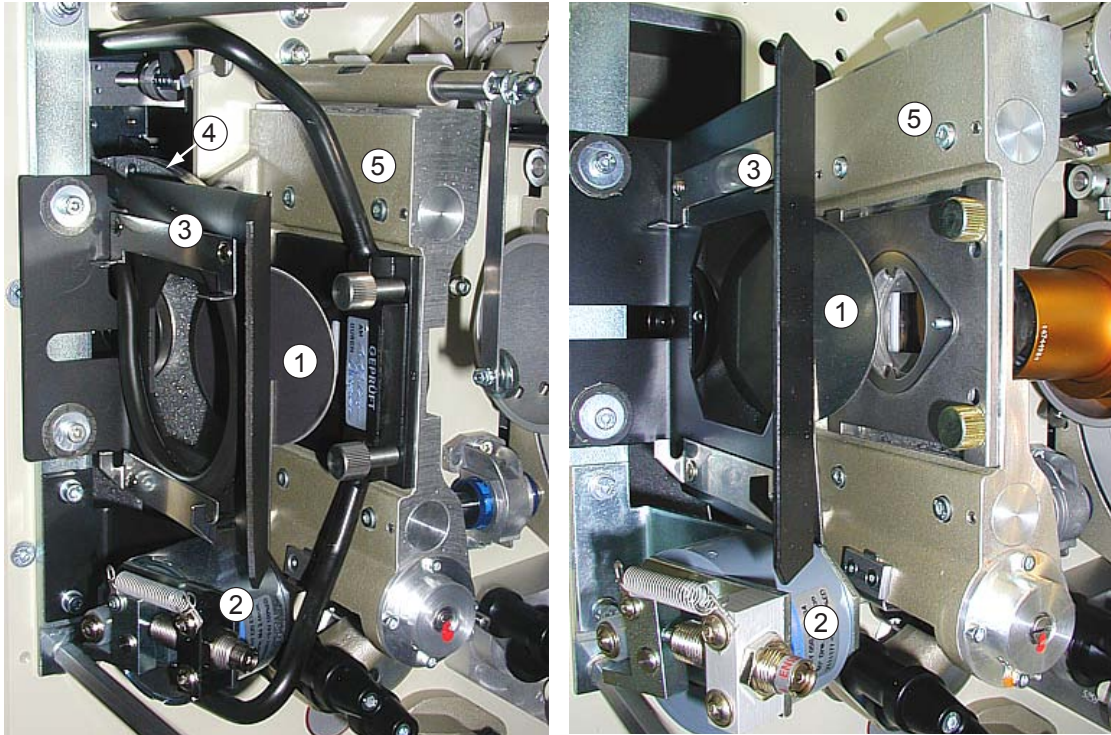
► **NOTE**

- ▷ Adjusting the film pressure skate, see chapter 6.4.2.
- ▷ Adjusting the height of the film pressure skate, see chapter 6.4.3.



### 3.2.2 The Dowser

The dowser opens or closes the path of xenon light to the film gate.



- ① Dowser
- ② Dowser rotation solenoid
- ③ Light baffle
- ④ Rotary shutter
- ⑤ Film gate with water cooling unit or fire protection plate



#### **ATTENTION**

If the dowser does not close while the projector is stopped, the film will burn.

### 3.2.3 Single Aperture Plates (only with manual lens turret or lens holder)

Push the single aperture plate into the film gate until the stop is reached and the aperture plate snaps into position.

### 3.2.4 Aperture Changer (option, only with electronic lens turret)

The aperture changer is suitable for automatically changing the aperture when the corresponding format key has been pressed. Simultaneously the lens is changed too.

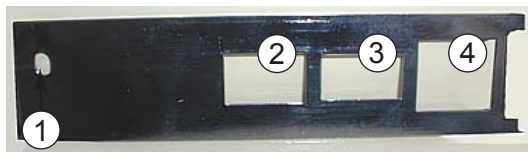


① Aperture changer

② Aperture

③ Drive pin (with knurled nut installed)

- Push the aperture into the film gate and place the aperture changer drive pin into the hole on the aperture. Tighten the knurled nut on the drive pin.



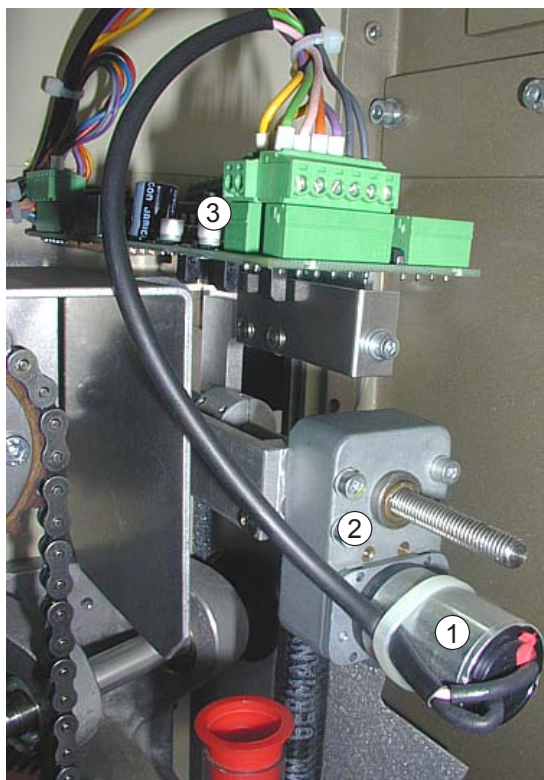
① Hole for drive pin

② 1:1.66 aperture

③ 1:1.85 aperture




④ 1:2.39 aperture

### 3.2.4.1 Drive and Control





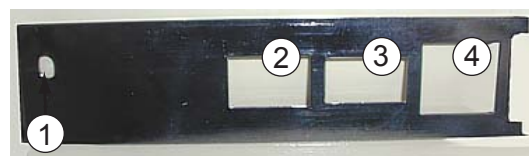
- ① Aperture changer motor
- ② Aperture changer drive
- ③ Aperture changer/lens turret control board

### 3.2.4.2 Format Change with Three Lenses

- Push ,  or  on the operating panel.
- The aperture changer places the selected aperture into the film gate and the matching lens in position.


### 3.2.4.3 Format Change with Two Lenses Turret

- Push  or  on operating panel (if existing).
- If the lens turret is equipped with two lenses and the aperture has three openings you can select any two of the three aperture openings to work with the two lenses. For example for some shows the format change could be between CS (Cinema-Scope) and WS (1:1.85) and for other shows the format change could be between WS (1:1.85) and NS (1:1.33).  
The following format combinations are available:
  - format combination ② and ③ or
  - format combination ③ and ④ or
  - format combination ② and ④





### 3.2.4.4 Changing the Format Combination

- The “select” function is activated by holding the  control closed more than 2 seconds.
- ☛ The turret will not rotate. The turret solenoid makes a clattering sound which means that a new format combination has been selected.
- ☛ The format combination changes to the next combination, for example:
  - from ② and ③ to ③ and ④.
 If you activate the “Select” input again the format combination will be changed again, for example:
  - from ③ and ④ to ② and ④ and so forth. After the “Select” input was selected three times, the combinations repeat.

► **NOTE**

Check your selection and push WS (flat) or CS (scope) button. The turret turns to the selected lens and the aperture changer changes to the selected aperture.

► **HINT**

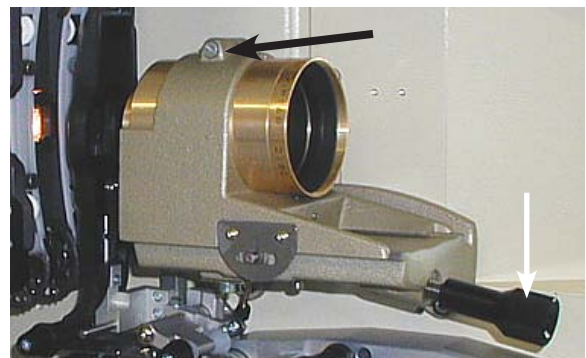
Make a note which shows you which aperture combination is chosen after how many times the SELECT button was pushed.

► **NOTE**

- ▷ Changing the aperture changes the lens too, see also lens turret, chapter 3.2.6.2.
- ▷ If the projector is equipped with an aperture changer do not push single aperture plates into the slit, because there is no stop and lock device for that aperture plate.

### 3.2.5 Lens Holder

- Loosen the clamping screw (black arrow) for inserting a lens and then tighten the screw again.
- For focusing turn the focusing adjusting knob (white arrow).

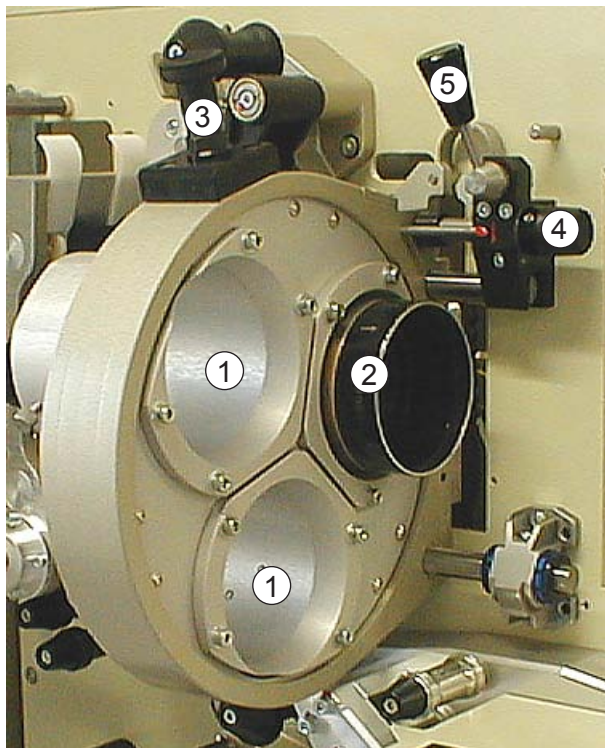


► **NOTE**

Adjusting the lens holder, see chapter 6.4.5.

### 3.2.6 Lens Turret (option)

#### 3.2.6.1 Manual Lens Change



- ① Lens tubes
- ② Lens in lens tube
- ③ Handle (arresting pin)
- ④ Focusing knob (manual)
- ⑤ Position lever for moving the lens turret away from the gate

- Loosen the knurled screws.
- Push the lenses into the lens tubes.  
The tubes are labelled CS (1:2.40), WS (1:1.85) or NS (1:1.33).
- Precisely focus each lens in its tube without adjusting the focus knob.
- Fasten them with the knurled screws.

► **NOTE**

Some lenses may require rings to support the rear section; these are available from Kinoton.

- For easy film threading flip the position lever - the lens turret will move away from the film gate.

**Make sure to put the lever fully back in position before projecting!**

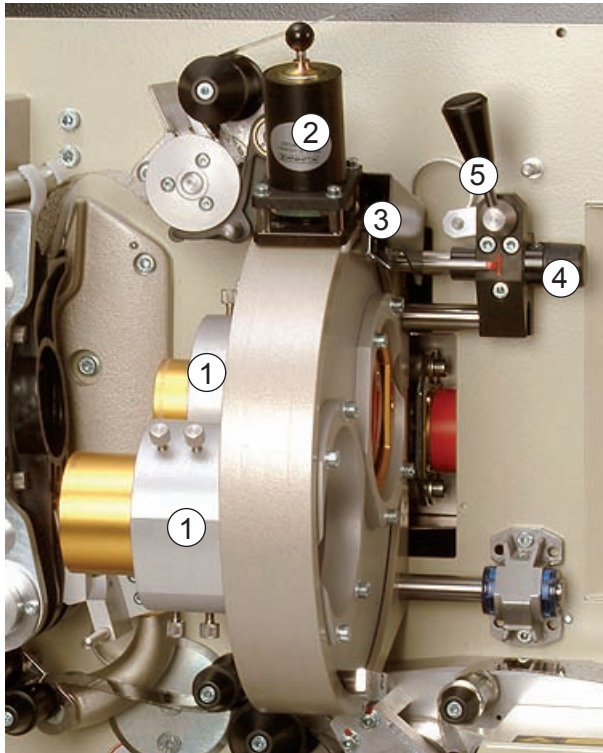
- To rotate a lens into position, pull out the handle and turn the lens turret to the desired position. Let handle drop – lens turret is positioned.

► **NOTE**

It is possible to set the handle so it remains up so that the turret can continuously rotate. This position is not used for normal operation.

### 3.2.6.2 Electronically Controlled Lens Change (option)

The electronically controlled lens turret is suitable to change the lens automatically when the corresponding format key has been pressed. Simultaneously the applicable aperture is changed too.

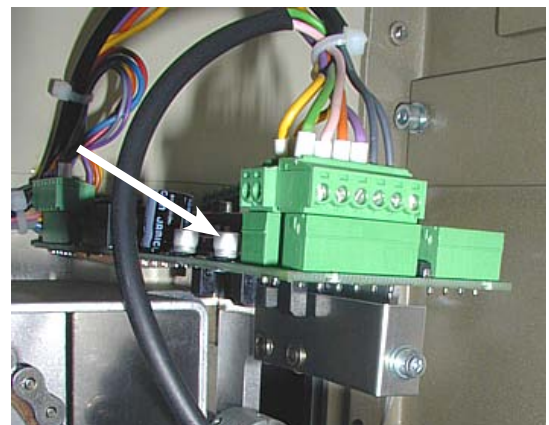
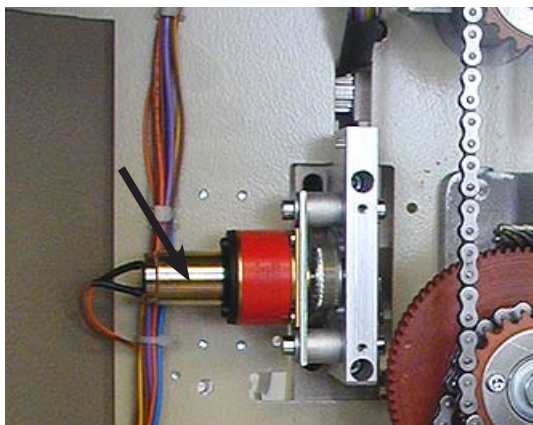


- ① Lens tubes with lenses
- ② Latching solenoid
- ③ Sensor board (covered)
- ④ Manual focusing
- ⑤ Position lever for moving the lens turret away from the gate

- To select a lens, push one of the format buttons.
- The light barrier on the sensor board senses the position of the corresponding coding plate (one coding plate for one lens).
- The lens turret will stop at that position and be magnetically latched.

#### Drive and Control

The lens turret/aperture changer control board (arrow, right figure) activates the turret motor (arrow, left figure), which changes the lens via a toothed belt.



#### ► NOTE

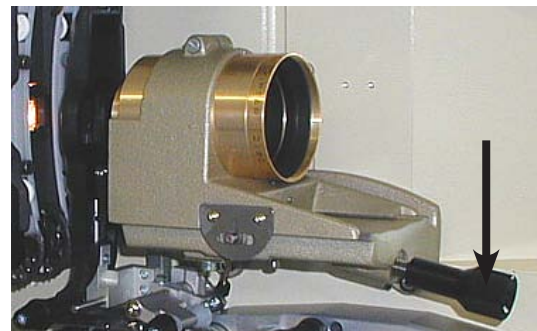
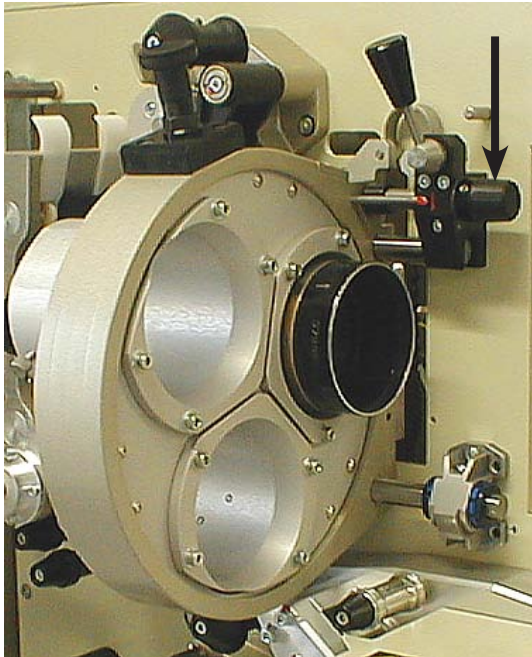
- ▷ When changing the lens the aperture is changed too (see also chapter 3.2.4).
- ▷ Initializing the EE-PROM should be only carried out by experts.

### 3.2.7 Focusing

To adjust the focus for a sharp picture on the screen, you have to move horizontally the whole lens turret or lens holder. This operation can be done manually or electronically controlled.

#### 3.2.7.1 Manual Focusing with Lens Turret / Lens Holder

- Turn the focusing knob (arrows) to move the lens turret or the lens holder.



#### 3.2.7.2 Electronic Focusing with Lens Turret (option)

Pushing the focusing buttons triggers the control board (placed over the aperture changer/lens turret board or separate over the focus motor) to activate the turret motor (placed over the lens turret motor or separate), which shifts the lens turret via a toothed belt driving a threaded shaft.

► **NOTE**

Electronic focusing can only be carried out with open dowser.

#### 3.2.7.3 Electronically Controlled Lens Holder Focusing (option)

When operating the focus controls, the focus motor rotates a shaft with a eccentric segment at the end. That eccentric is located between the focus shaft and the lens holder and thus shifts the lens holder fore and aft as it rotates.

► **NOTE**

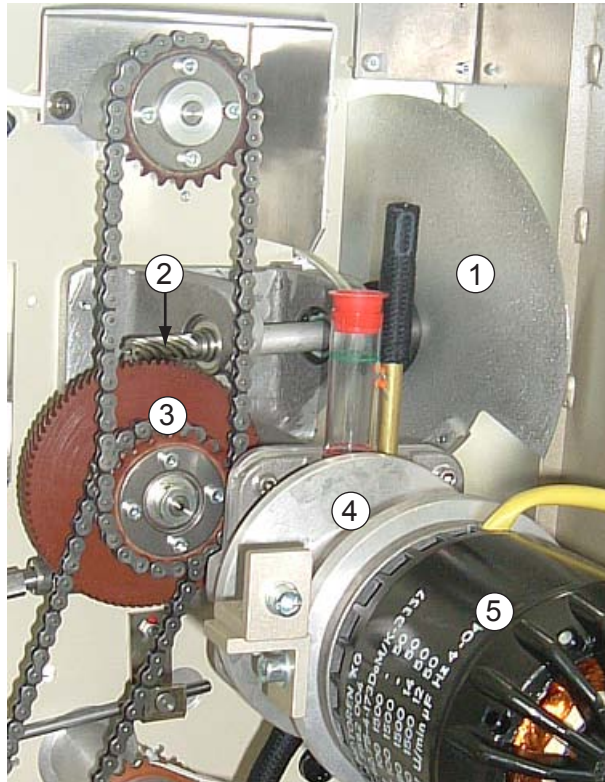
Electronic focusing is only carried out with open dowser.



### 3.2.8 Rotating Shutter

The rotating shutter interrupts the projection light once during the film transport and once during the picture standstill. (48 interruptions a second at 24 pictures a second).

The shutter is mounted on a shaft which is driven from the intermittent movement via a fibre gear.



- ① Shutter (1-blade)
- ② Shutter shaft
- ③ Fibre gear and drive unit
- ④ Intermittent sprocket drive
- ⑤ Main drive motor



#### **DANGER**

Only remove or replace the shutter housing when the projector is off. If you have to work on the projector while it is running be very careful not to touch the rotating shutter. Serious cuts can result.

#### ► **NOTE**

The shutter is factory-set. Nevertheless, if necessary only trained service personnel is allowed to adjust the shutter timing.

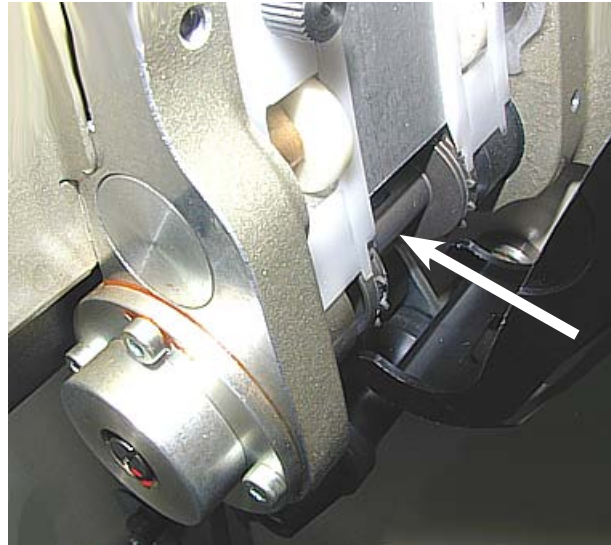
### 3.2.9 Intermittent Sprocket

The intermittent sprocket (arrow) is a very precise sprocket. It transports the film step by step through the film gate.

The intermittent sprocket is driven via the intermittent sprocket drive by the main drive motor.

► **NOTE**

The sprocket is factory-set.  
All adjustment must only be carried out by experts.

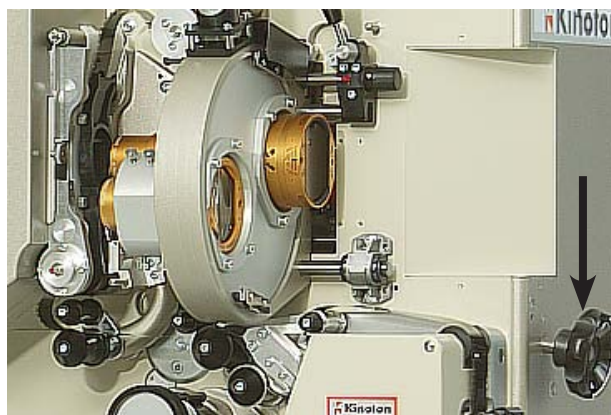
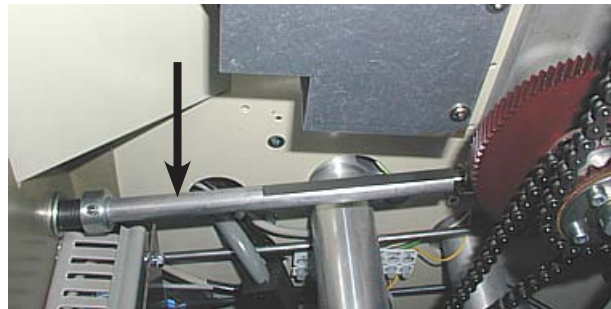


### 3.2.10 Framing

There is an adjustment to move the frame up and down because the picture must be positioned correctly in the film gate. The framing control should be kept in mid-position to allow correction in either direction. There are white position reference dots on the knob and projector for your convenience. These may not align exactly.

The intermittent sprocket and Maltese cross shafts have opposing splines and are connected with a bushing.

When sliding the bushing (by turning the framing knob and the framing shaft) the sprocket will rotate relative to the Maltese cross. With this action the adjustment of the shutter will not be changed.

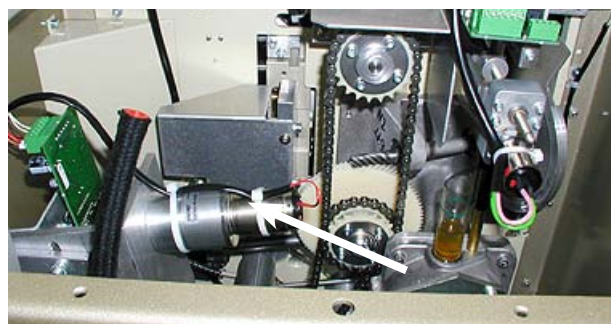


#### Manual Framing

- Adjust the framing position by turning the framing knob (arrow).
- Turning the framing knob to the right => frame moves upwards
- Turning the framing knob to the left => frame moves downwards

#### Electronic Framing (option)

When pushing the framing buttons the motor slides the framing bushing via a chain and the sprocket will rotate relative to the Maltese cross.



### 3.2.11 Constant Speed Sprockets

Sprockets are designed to transport the film continuously. The teeth of the sprocket engage the perforations of the film. Both sprockets provide for equal loops before and after the film gate.



- ① Feed sprocket / bottom or holdback sprocket
- ② Pad shoe with handle
- ③ Ring nut with spring
- ④ Film stripper
- ⑤ Guide roller
- ⑥ Hand wheel

- » The feed sprocket (left figure) pulls the film from the take-off friction or platter to the film gate.
- » The bottom sprocket (right figure) pulls the film out of the sound head and feeds it to the take-up friction or platter.
- » The pad shoe holds the film on the sprocket.
- » The film stripper prevents broken film from being wound up around the sprocket.
- » With the handle you can open the pad shoe to thread the film.



### Operating a Pad Shoe Gently

The pad shoe has a brass bearing tube which pivots on the pad shoe shaft, and is positioned with a ring nut and a spring.

To avoid damaging the pad shoe and causing the brass tube to revolve within the pad shoe, the pad shoe must be handled gently.

Follow these points:

- Do not slam the pad shoe closed.
- Only open the pad shoe as far as the stop pin.
- Do not open the pad shoe too far - over the stop pin - the spring will break and the brass tube will be damaged.

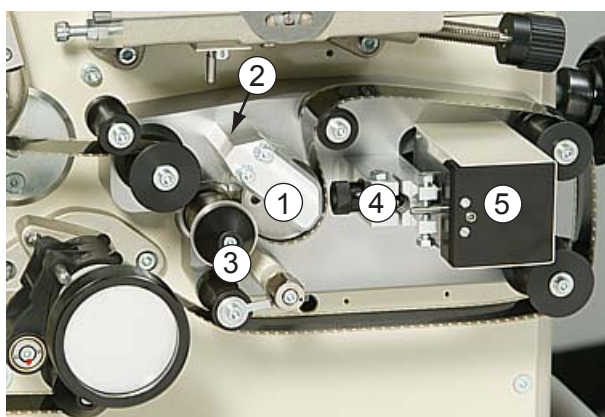
#### ► NOTE

- ▷ Changing a constant speed sprocket and a pad shoe and adjusting the pad shoe spring, see chapter 6.4.2.
- ▷ Adjusting the distance between the pad shoe and the sprocket, see chapter 6.4.8.
- ▷ Adjusting the film break sensor, see chapter 6.4.9.

## 3.3 Reverse-Scan Sound Device

Reverse-scan sound devices scan the sound track (analog and optional DOLBY digital) on the film by means of red LEDs.

### 3.3.1 Analog Reverse-Scan Sound Device (non-upgradeable)



- ① LED holder with LED
- ② Sound drum
- ③ Sound pressure roller
- ④ Analog sound optics
- ⑤ P.C. board with solar cell

#### ► NOTE

A non-upgradeable analog reader will not accept cue detectors.



### 3.3.2 Reverse-Scan Sound Device Analog and optional DOLBY Digital (upgradeable)

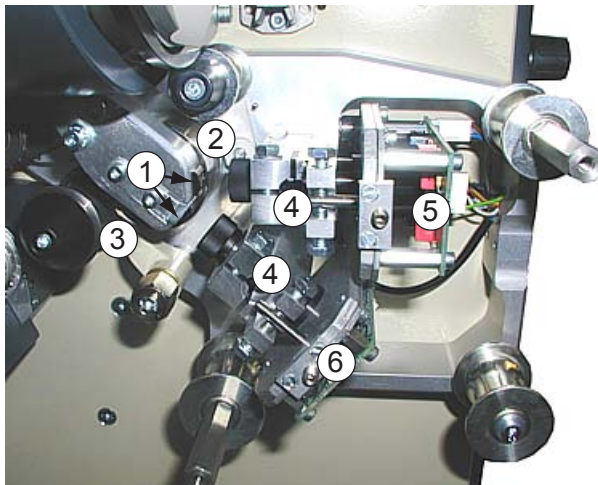
The Reverse-Scan Sound Device contains an analog sound reader and optionally a Dolby digital reader.



#### ► NOTE

- ▷ An only analog sound device is upgradeable with DOLBY digital.
- ▷ The reverse scan sound head is delivered factory checked and adjusted.
- ▷ Optional cue sensors for reading metal foil tapes can be mounted in the reverse scan sound device.

#### 3.3.2.1 Components



- ① LED holder with optional second digital LED
- ② Sound drum
- ③ Sound pressure roller
- ④ Analog (upper) and optional digital (lower) sound optics
- ⑤ P.C. board with solar cell (analog)
- ⑥ P.C. board with CCD-unit (digital)

### 3.3.3 Sound Tracks on the Films

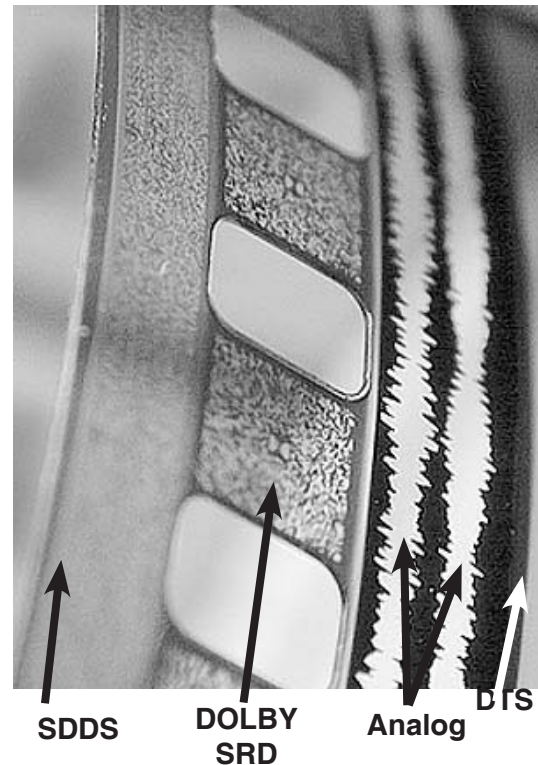
The **analog sound** is printed as two wavy lines on the film.

The height of the amplitude signifies loudness, frequency signifies pitch.

The **Dolby digital sound** information (DOLBY SR·D) is encoded between the perforations.

The **DTS digital sound** information is encoded between the picture and the analog sound track.

The **SDDS** information is encoded on the edges of the film.



### 3.4 SDDS Reader / DTS Reader (option)

Optionally a DTS Reader and/or SDDS Reader can be attached to special holders on the projector for reading the corresponding sound track on the film.

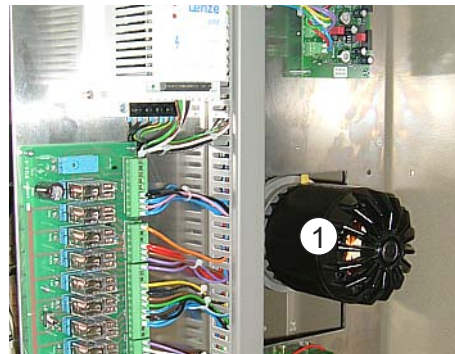
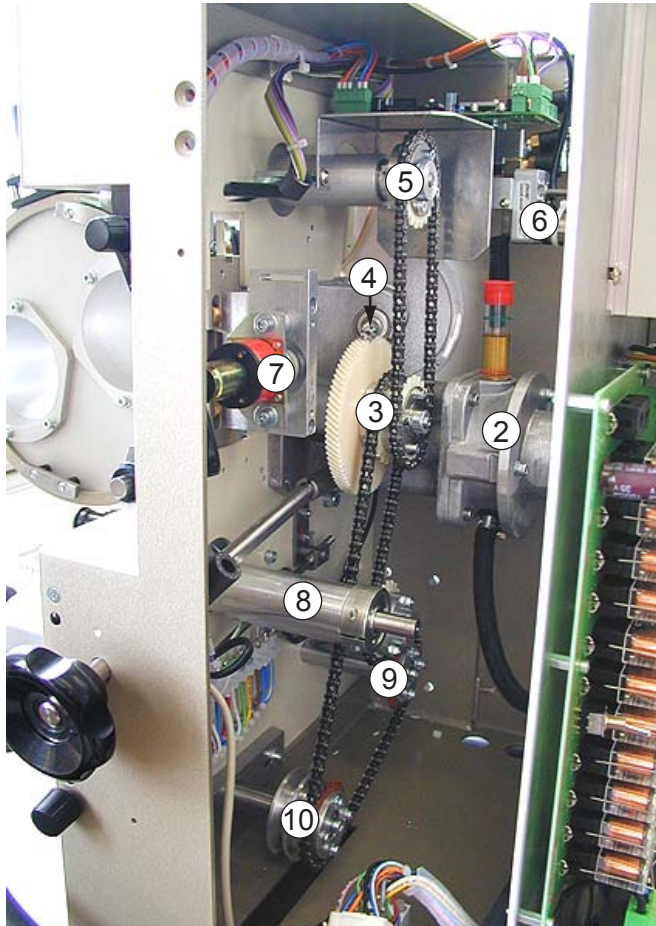
### 3.5 Film Cleaner (option)

Optionally the projector can be equipped with a film cleaner.

### 3.6 Drive Components in the Projector Head

► **NOTE**

- ▷ In this chapter you will get an overview of the drive components.
- ▷ All work on drives should only be carried out by experts.



- ① Main drive motor
- ② Intermittent movement directly flanged on main drive motor
- ③ Fibre gear: drives shutter and sprockets
- ④ Shutter drive
- ⑤ Feed sprocket shaft & cog
- ⑥ Aperture changer drive (option)
- ⑦ Lens turret drive (option)
- ⑧ Sound shaft
- ⑨ Bottom/holdback sprocket shaft & cog
- ⑩ Chain tension sprocket

#### 3.6.1 Main Drive

Via gears the following shafts are driven by the main drive motor ①:

- intermittent movement ②
- feed sprocket ⑤
- bottom sprocket ⑨
- shutter ④

The 3-phase motor directly drives the Maltese Cross which is flanged onto the motor. The two sprockets shafts and the shutter shaft are driven by the motor via chains and gears.

► **NOTE**

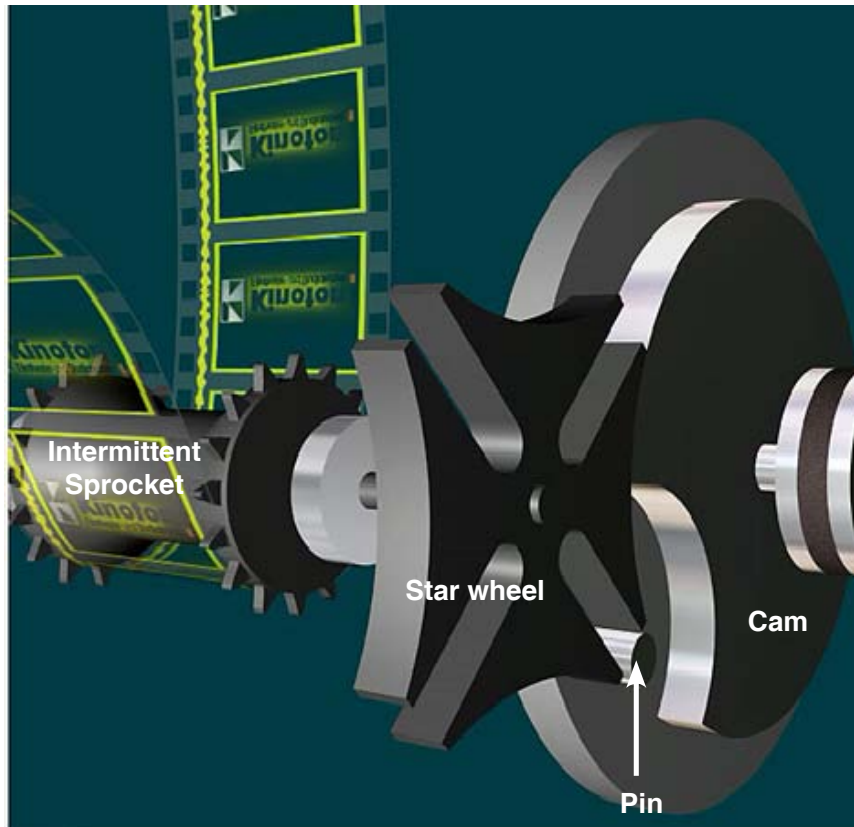
Tension the chains, see chapter 6.4.10.

### 3.6.2 Intermittent Movement (also called a Maltese Cross or a Geneva Movement)

To pull the film down one picture at a time the intermittent sprocket has to move the film ahead by four sprocket teeth ( $\frac{1}{4}$  of a complete rotation):

A motor rotates the cam continuously. During each rotation the cam's pin engages one of the slots in the starwheel and pulls it  $\frac{1}{4}$  turn. As soon as the pin leaves the slot, the outer surface of the cam engages the curved surface of the starwheel which prevents the starwheel from turning until the pin engages the next slot.

During this time the film is held still in film gate and is able to project the picture.



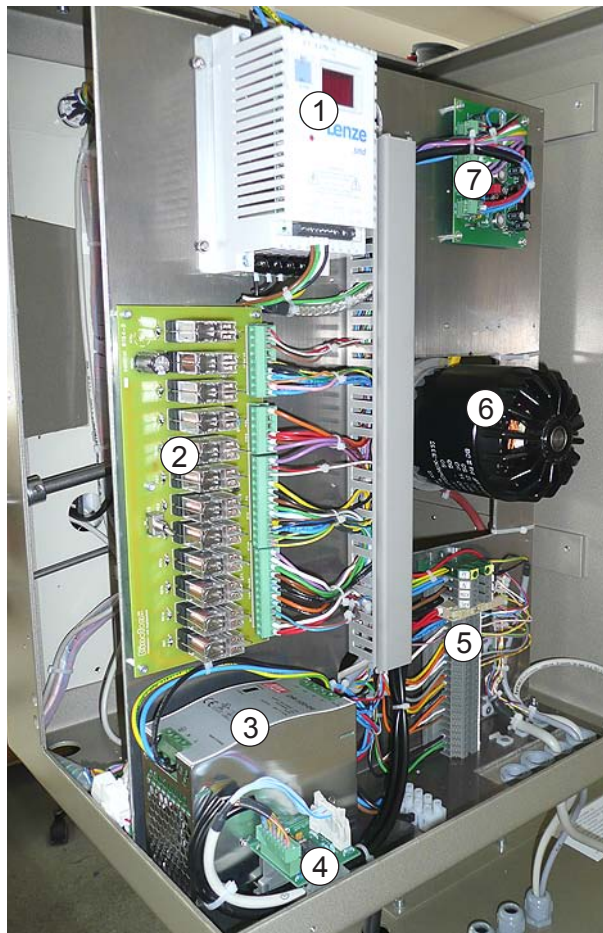
The intermittent movement is in a closed oil bath.



### 3.7 Electronic Components in the Projector Head

► **NOTE**

- ▷ This chapter gives an overview of the electronic components.
- ▷ All work on electronic parts should only be carried out by experts.



- ① Frequency inverter
- ② Control board with relays
- ③ 24 V power supply unit
- ④ Internal terminal strip with fuse
- ⑤ Main drive motor
- ⑥ LED power supply board
- ⑦ Friction adapter board (option for spool rack with 2 friction drives)

► **NOTE**

- ▷ You will find the control board connection plan in chapter 8.2.1.
- ▷ For wiring information, see chapters 8.4.1 and 8.4.2.

#### 3.7.1 Connectors

The male and female connectors (arrow), which are behind the electronic mounting plate, connect the basic unit to the projector head.



► **NOTE**

- ▷ You will see the plan of terminal connection in chapter 8.2.2.
- ▷ You will get an overview of male and female sockets in chapter 8.2.3.

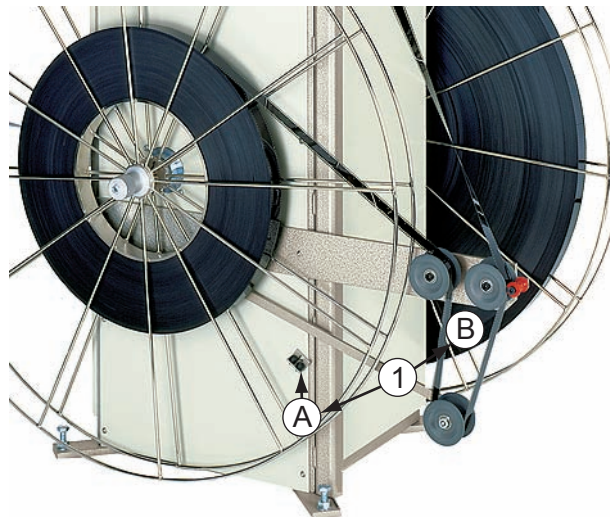
### 3.8 Spool Tower Components



- ① Spool tower
- ② Rear take-off friction with film spool
- ③ Fore side take-up friction with film spool
- ④ Fore side extension arm with guide rollers
- ⑤ Lever arm

### 3.8.1 Lever Arm

The rotary speed (revolution) of the friction drive depends on the reel diameter. The current diameter is calculated by the position of the lever arm. At a film break the lever arm falls to the stop position and activates the film break switch - the friction drive will be stopped.



- ① lever arm
- Ⓐ stop position
- Ⓐ - Ⓑ working position range

#### ► NOTE

- ▷ At projection operation the film must be threaded via both lever arms.
- ▷ At rewind, make-up and tear-down operation the film must be threaded via the lever arm of the take-off friction (lower/rear side). The other lever arm stays free.
- ▷ See also threading instruction in chapter 5.2.

#### Procedure

During operation - the film spools turn - the lever arm(s) ① will be hold in the range of the working position Ⓐ - Ⓑ:

- E. g. the diameter of the take-off film reel gets smaller and smaller therefore the lever arm moves out of the range of the working position.
- The excursion of the lever arm will be registered by the control unit. The control unit calculates the correct rotary speed for the current reel diameter and transmits the value to the corresponding friction drive.
- The friction drive will be adapted and the lever arm returns to the working position range.

Lever arm moves to stop position Ⓐ:

- The film break switch will be activated.
- The friction drive will be decelerated until complete stop.
- To activate the friction drive again, the lever arm must be moved out of its stop position, therefore manually turn the corresponding film spool (tense film).



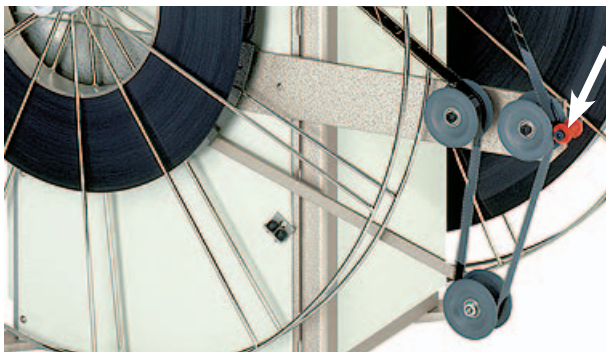
#### ATTENTION

Do not hinder the excursion of a lever arm.



### 3.8.2 Guide Rollers

The guide rollers are suitable to guide the film correctly.



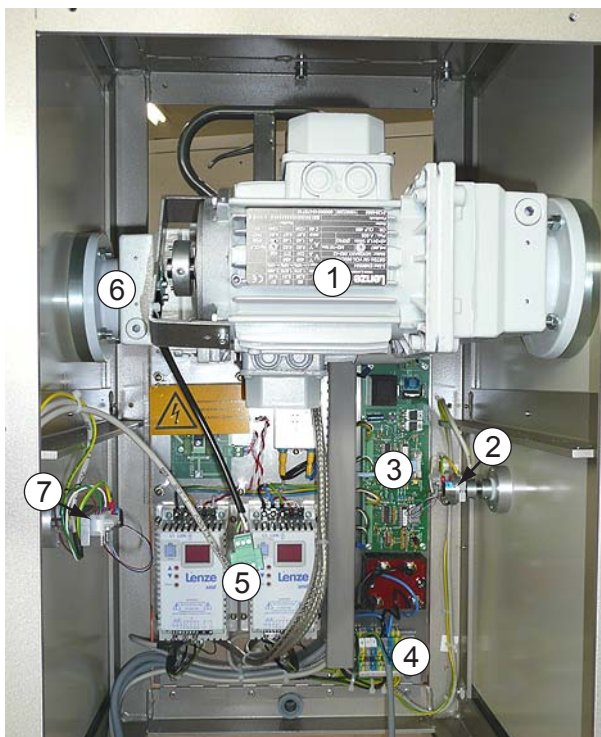
► **NOTE**

Thread the film between guide roller and stay roller (if existing) (arrow).

### 3.8.3 Friction Drive and Electronic Components

► **NOTE**

- ▷ This chapter gives an overview of the drive and electronic components, which are mounted in the spool tower.
- ▷ All work on drives should only be carried out by experts.



- ① Friction motor (with Hall generator board) to drive the fore side take-up friction
- ② Potentiometer for fore side lever arm
- ③ Friction control board
- ④ Main terminal strip
- ⑤ 2 frequency inverters (right inverter for the rear friction drive)
- ⑥ Friction motor to drive the rear take-off friction
- ⑦ Potentiometer for rear side lever arm

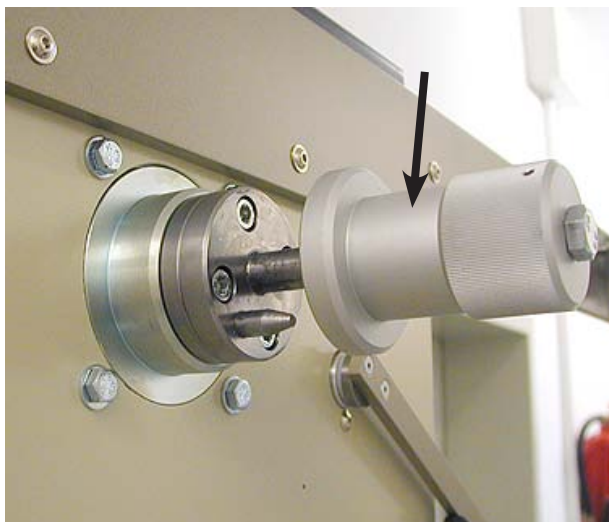


### Procedure

- » The control unit on the control board determines the motor rotary speed depending on the film reel diameter.
- » The frequency inverter transmits the values from the control unit to the motor.
- » The Hall generator board (arrow) on the friction motor (fore side take-up friction) additionally controls the fore side film reel speed.  
If the rear film reel speed is getting too high - the reel diameter is getting larger - a "too fast" signal will be sent to the control unit.  
Then it will transmit a reduced speed value to the Hall generator - the fore side friction drive reduces its speed.



### Friction Shaft



### ATTENTION

**Always** secure the pinned film spools by screwing on the lock nut (arrow)!

### 3.9 Spool Rack Components

Normally the spool rack is equipped with an electronically controlled take-up friction (fore side) and a passive mechanical take-off friction (rear side) for projection operation only.

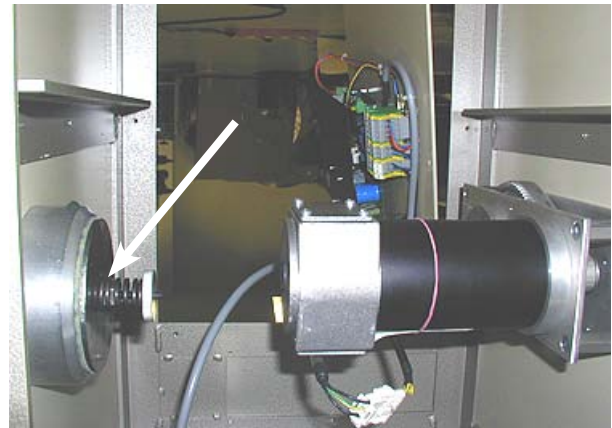
Optionally the spool rack can be equipped with two electronically controlled friction drives for additional rewind operation.



- ① Spool rack
- ② Front side friction shaft
- ③ Extension arm with guide roller for film coming from rear side friction shaft

### 3.9.1 Non-Driven Rear Side Take-off Friction

Generally the spring (arrow) pushes the driving disk and the felt disk against a fitted disk on the friction body. The more the pressure onto the felt disk the more braking effect results.



This “take-off clutch” provokes that a certain traction force is necessary to wind off the film. This friction prevents spinning of the film spool in case the projector suddenly stops which would cause film clutter – in the worst case the film material could be damaged or even break.

► **NOTE**

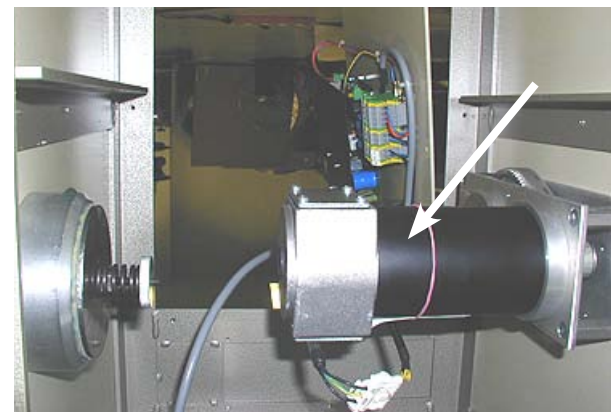
- ▷ Adjusting the mechanical friction, see chapter 6.4.11.
- ▷ Changing the felt disk of the friction is described in chapter 6.4.12.

### 3.9.2 Electronically Controlled Fore Side Take-up Friction

The take-up friction shaft is driven by a controlled motor (arrow).

► **NOTE**

- ▷ Normally the set value is pre-adjusted and must not be changed. Nevertheless, if adjustments are necessary, they should be carried out by service engineers.
- ▷ Operating the frictions, see chapter 4.4.



**ATTENTION**

Never use reels which have an inner diameter less than  $\frac{1}{4}$  of the reel diameter because the film tension gets too large when the reel diameter approaches the inner diameter.

### 3.9.3 Electronically Controlled Fore Side and Rear Side Friction Drives (option)

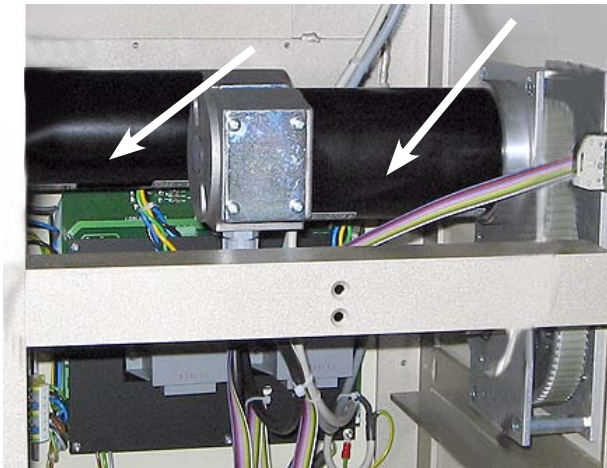
Both friction shafts are driven by controlled motors (arrows).

Two friction drives are necessary if the projector is equipped either

- with a reverse running unit for reverse running through the film gate

or

- with a rewind control for rewind operation - film is guided outside the film gate.



#### ► NOTE

▷ Normally the set value is pre-adjusted and have not to change. Nevertheless, if adjustments are necessary, they should be carried out by service engineer of KINOTON (see projector's service manual).

▷ Operating the frictions, see chapter 4.4.4.



#### ATTENTION

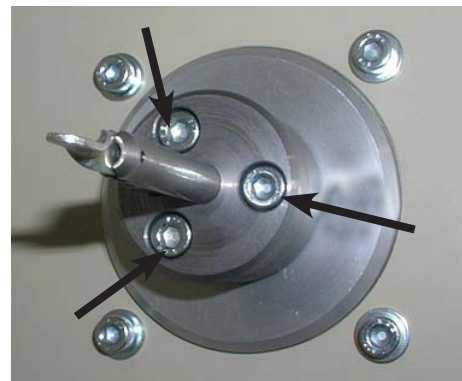
Never use reels which have an inner diameter less than  $\frac{1}{4}$  of the reel diameter because the film tension gets too large when the reel diameter approaches the inner diameter.

### 3.9.4 Reel Shaft on an Interchangeable Flange

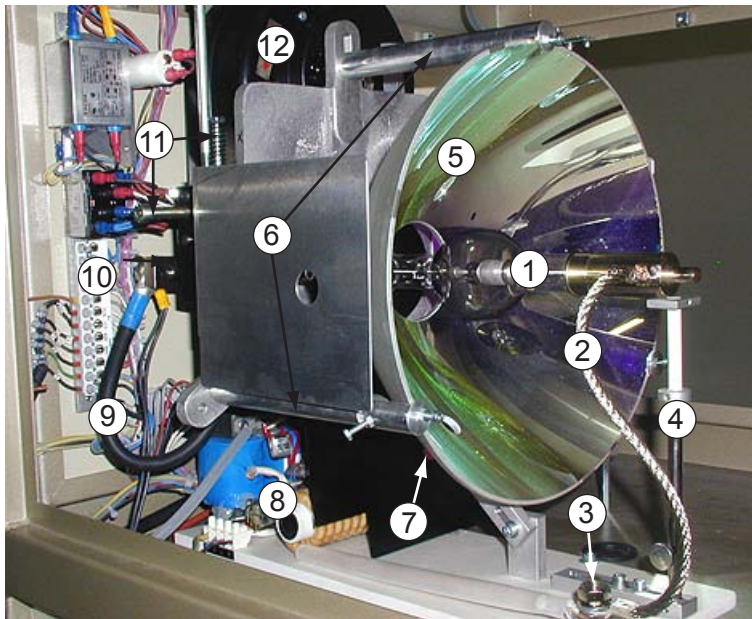
The reel shaft is mounted with a changeable flange (for different sizes of film spools).

To fix a film spool/reel you have either to close lock bar or screw on a knurled nut.

- To change the flange loosen the 3 Allen screws (arrows) and change the flange.



### 3.10 Lamphouse Components



- ① Xenon bulb
- ② Anode (+) cable
- ③ Anode connecting bolt
- ④ Bulb support (up to 7,000 W only)
- ⑤ Mirror
- ⑥ Mirror holders and protection shield
- ⑦ Stabilizing magnet
- ⑧ Ignition base
- ⑨ Cathode (-) cable
- ⑩ Terminal strip
- ⑪ Mirror adjustment screws
- ⑫ Fan



#### **DANGER**



- ▲ The xenon lamp can only be ignited, when the lamphouse door is closed. If you open the door during the operation the door switch will be activated and the xenon lamp will turn off immediately.



- ▲ You can suffer hurts when broken glass is flying around (xenon bulb has an inner pressure of 8 to 10 bar in cold condition and about 30 bar in hot condition). Because of that you have to wear a protective suit, protective gloves and a face/neck protection during all works with lamphouse open.



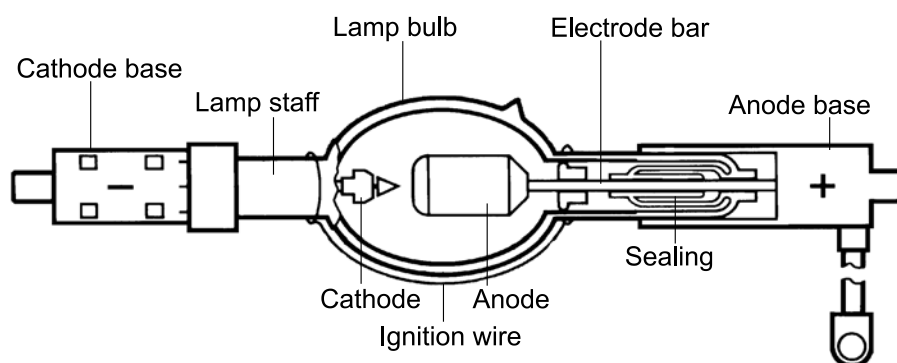
### 3.10.1 Xenon Unit

- The xenon unit consists of: reflector with holder, xenon bulb support and adjusting units, mounting plate with starter gap, ignition unit, stabilizing magnet with holder and fan.
- Two different xenon units for the following xenon lamps are available:
  - 1,000 W to 2,000 W
  - 2,000 W to 7,000 W

► **NOTE**

- ▷ The xenon unit is factory-set positioned at the back of the lamphouse.
- ▷ The adjustment of the optical axis has to be carried out by authorised experts or service personnel from KINOTON.
- ▷ The small xenon unit can be equipped with xenon bulbs 1,000 to 2,000 W which will be easily screwed in.
- ▷ The big xenon unit can be equipped with xenon bulbs 2,000 to 7,000 W. To install them an adapter has to be put on the cathode base. The bulb with the attached adapter will be fastened by turning an Allen screw from the lamphouse outside.

### 3.10.2 Xenon Bulb



The lamp bulb out of quartz glass encloses the electrode system and the xenon gas. The discharge arc burns between the anode (+) and the cathode (-). The cathode delivers the electrons. The anode takes off the electrons. The resulting brake energy will be transformed into heat energy and then reflected. The discharge arc (light arc) is stabilized through a magnet.

► **NOTE**

Changing and disposing of the xenon bulb, see chapter 6.4.14.

### 3.10.3 Mirror

Nowadays cold mirrors are mostly used. Because of their coating, heat can diffuse the mirror – the film gate gets a less range of heat but the full range of light.

The following mirrors are available:

- ✓ Xenon unit 1,000 W to 2,000 W, Ø 300 mm
- ✓ Xenon unit 2,000 W to 7,000 W, Ø 340 mm



#### **ATTENTION**

Do not touch the inside of the mirror with bare hands. If necessary carefully remove fingerprints with an alcohol-soaked cloth.

#### ► **NOTE**

- ▷ The mirror should only be changed by trained service personnel.
- ▷ The reflector should only be changed and adjusted roughly by the projectionist in case of need, therefore see chapter 6.4.18.





## 4 Operating Elements

### 4.1 External Projector Operating Panel




**PROJ. START** Projector START

**PROJ. STOP** Projector STOP

 Dowser OPEN


 Dowser CLOSE

**POS** Position the frame

 **NS** Format NS (option)

 **CS** Format CS (option)

 **WS** Format WS (option)

 Framing UP (option)

 Framing DOWN (option)

**SELECT** Format SELECT  
(option for 2 lens turret)

**FOCUS +** Focusing + (option)

**FOCUS -** Focusing - (option)

#### ► NOTE

The buttons of operating panel illuminate when activating the projector.

### 4.2 Operating Mode Switch (option)

The FP 25 D projector on a spool rack can be equipped with a rotary switch for selecting projection or the rewind mode.

Rewinding is possible if the spool rack is constructed with 2 electronic friction drives.

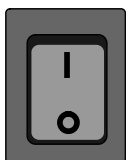


### 4.3 Spool Tower Operating Elements



- ① Main switch
- ② Fuse (6.3 A)
- ③ Toggle switch for spool size selection
- ④ Operating mode rotary switch
- ⑤ Press button: STOP
- ⑥ Speed rotary switch

#### 4.3.1 Main Switch



**Main switch in position I:**

Spool tower is powered on. Switch lamp illuminates red.

**Main switch in position 0:**

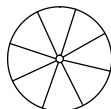
Spool tower is off. Switch lamp is off.

#### 4.3.2 Toggle Switch: Spool Size



Switch in position 

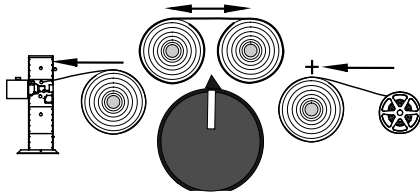
=> up to 4000 m spool size is selected.

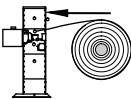


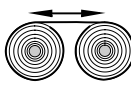
Switch in position 

=> 4000 or 5000 m spool size is selected.

### 4.3.3 Rotary Switch: Operating Mode



Switch in position  => Projecting

Switch in position  => Rewind, make-up, tear-down  
Film break switch is active.

Switch in position  => Making up with mechanical friction  
Film break switch is inactive.

#### ► NOTE

- ▷ The film break switch is not activated.
- ▷ Threading information, see chapter 5.

### 4.3.4 Stop Button

**STOP**

Tearing down the program:



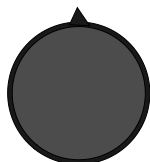
- Push stop button before reaching the end of the copy.
- The friction drive stops. The upper/fore side friction drive (take-up friction) will be activated after 10 seconds.

### 4.3.5 Potentiometer: Reel Speed



Turning the potentiometer anticlockwise => reel speed slows down

Turning the potentiometer completely to the left stop => reel speed slows down to zero.



Turning the potentiometer clockwise => start / reel speed accelerates

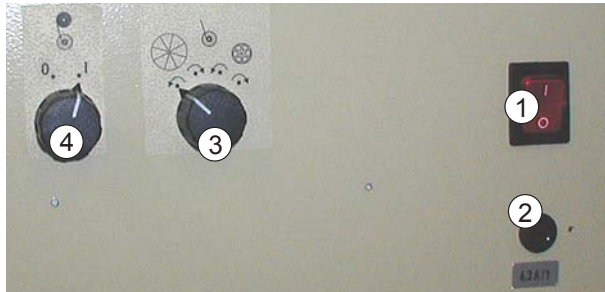
Turning the potentiometer completely to the right stop => maximum reel speed (approx. 10 min for 4000 m)

### 4.3.6 LED: Ready

The LED illuminates constantly, when potentiometer was turned to the left stop and the spool tower is ready for operation.

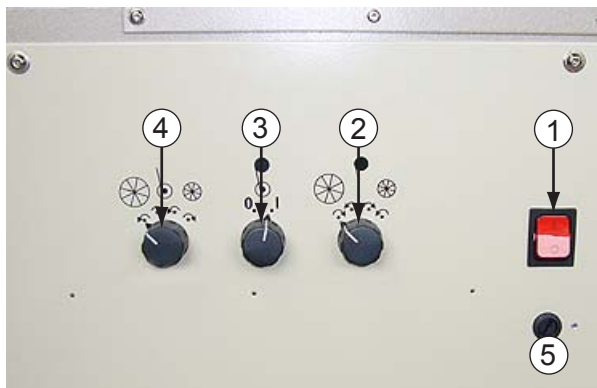
## 4.4 Spool Rack Operating Elements

### 4.4.1 Standard Spool Rack (1 electronic friction drive - for projection only)



- ① Main switch
- ② Fuse (6.3 A)
- ③ Rotary switch for selecting the spool size and tension direction
- ④ Rotary switch for switching ON/OFF the friction drive

### 4.4.2 Optional Spool Rack (2 electronic friction drives - for projection and rewinding)



- ① Main switch
- ② Rotary switch for selecting the spool size and tension direction -> fore side friction
- ③ Rotary switch for switching ON/OFF the friction drive
- ④ Rotary switch for selecting the spool size and rotation direction -> rear side friction
- ⑤ Fuse (6.3 A)

### 4.4.3 Main Switch on Spool Rack

**Main switch in position I:** Mains power is switched on.  
The main switch illuminates.

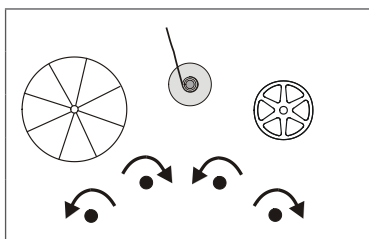
**Main switch in position 0:** Mains power is switched off.  
The main switch is off.

#### 4.4.4 Rotary Switches: Selecting the Spool Size / Rotation Direction

##### ► NOTE

- ▷ Depending on your demands, the size of frictions can vary. Generally you can select between a large (e. g. 4000 m) and a small (e. g. 600 m) friction.
- ▷ The adjusted turning direction (left or right) is that direction which is necessary to tension the standstill film.
- ▷ Always adjust the turning direction in a way that film is stressed.


##### Friction shaft selection: fore side (standard rack) / rear side (optional rack)

	Switch position	Reel size	Tension direction
	complete left	large	left
	half left	large	right
	half right	small	left
	complete right	small	right

##### Friction shaft selection: fore side (optional rack with 2 friction drives)

	Switch position	Reel size	Tension direction
	complete left	large	right
	half left	large	left
	half right	small	right
	complete right	small	left

#### 4.4.5 Rotary Switch: Switching Friction Drive ON/OFF

- 
 Switch in position "0": Friction motors are switched off
- 
 Switch in position "I": Friction motors are switched on

0. I



#### 4.4.6 Fuse

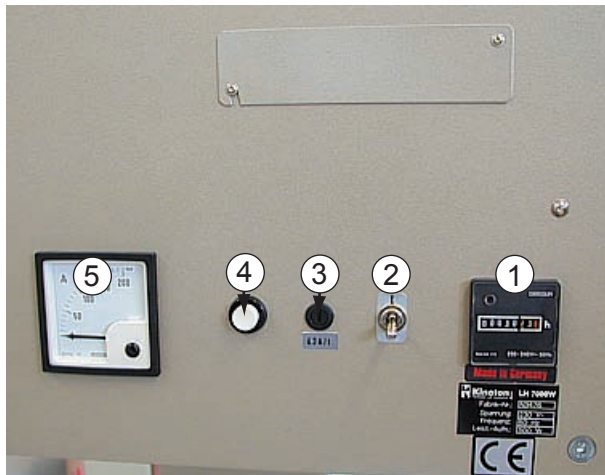
When the fuse is removed the projector is separated from mains and cannot be switched on by the main switch.



##### ATTENTION

You have to put out the fuse at all maintenance work and cleaning.

## 4.5 Lamphouse Operating Elements



- ① Operating hour counter
- ② Main switch
- ③ Fuse (6.3 A)
- ④ Press button: IGNITE
- ⑤ Ammeter

### 4.5.1 Main Switch

#### **Toggle switch in position “I”:**

The xenon lamp is ON. The ventilation runs after when the xenon lamp turns off.

#### **Toggle switch in position “0”:**

The xenon lamp is OFF.

#### **Manually switch on or switch off**

- Switch on the main switch (position “I”). The fan is running.
- Switch off the main switch (position “0”). The fan is off.

#### ► **NOTE**

The fan runs after (approx. 5 minutes) when the projector and the xenon lamp are switched off. This thermal switch is operating with a temperature of 60° C. If the temperature is less than 45° C the switch resets.

### 4.5.2 Operating Hour Counter

The operating hour counter shows the hours the xenon bulb has been in operation.

#### **4.5.3 Ammeter**

The ammeter shows the set intensity of currents.

- ✓ The small lamphouse (1000 to 2000 W) is equipped with a 100 A ammeter.
- ✓ The big lamphouse (2000 to 7000 W) is equipped with a 200 A ammeter.

#### **4.5.4 Ignition Button**

The xenon lamp automatically ignites when pushing the start button on the projector operating panel.

You can manually ignite the xenon lamp by pushing the ignition button.



##### **ATTENTION**

Do not push this button for more than 0.5 seconds. The xenon bulb can be damaged if you push for a longer time. If the xenon lamp does not ignite after you have pushed the button two to three times, the ignition unit or the rectifier or the xenon bulb probably have a defect.

#### **4.5.5 Fuse**

If you put out the fuse the lamphouse is separated from mains.



##### **ATTENTION**

You have to screw out the fuse at all maintenance work and cleaning.





## 5 Operation and Troubleshooting




### 5.1 Switch on and Start Projector / Stop and Switch off Projector






#### ATTENTION

Do not stand too close on rotating film spools, because clothes, hair or other parts of your body can get winded up or trapped into the spools.


#### Switch on and start the projector

- Switch on the external power supply for the performance room.
- Switch on the main switch  (position "I").
  - The switch illuminates red.
- Thread the film (see chapter 5.2).
- Push the  on the external operating panel.
  - The projector is running, the ventilation is on, the xenon lamp is on.
- If necessary push , to open the dowser after the start leader has run through.

#### Stop and switch off the projector

- To stop the projector manually push  and close the dowser by pushing .
  - The dowser closes, the xenon lamp gets off, the projector stops and the ventilation is on (if the temperature is more than 60° C).
- Switch off the main switch  (position "0").
  - The key lamp turns off.
- Switch off the external power supply for the performance room.

#### ► NOTE

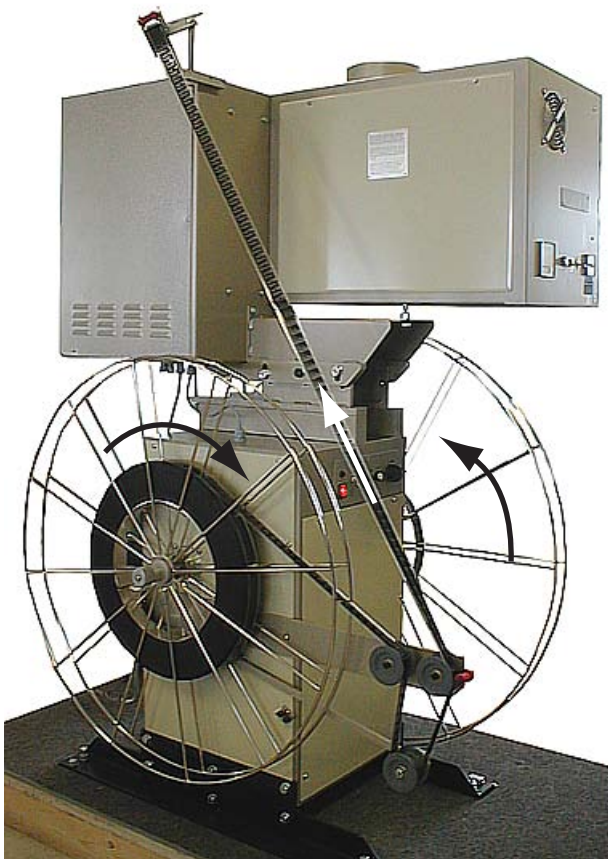
- ▷ If you have an emergency stop, push the main switch  (position "0"), to cut the power.
- ▷ If the film is run through the projector stops due to the film break sensor.

## 5.2 Threading the Film for Projection Operation

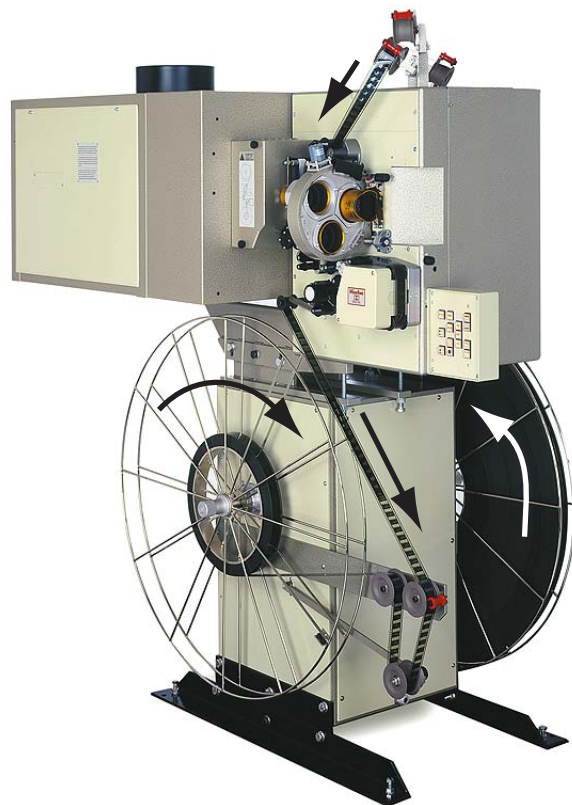
### 5.2.1 FP 25 D with Spool Tower

#### 5.2.1.1 Threading Overview

Back view



Front view

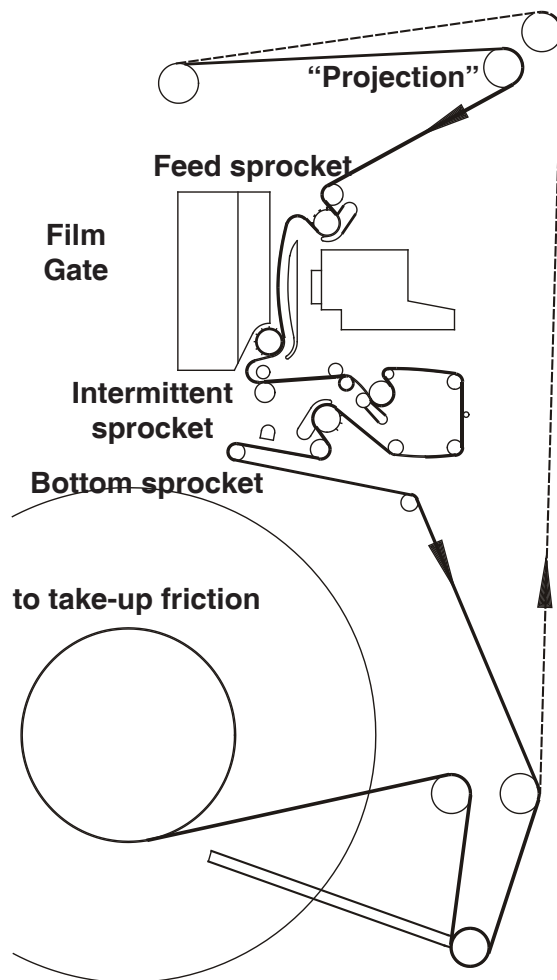


1. Put the **full film reel** onto the **rear friction shaft**
2. Thread the film via the **rear lever arm**
3. Thread the film through the guide rollers on the **rear extension arm**
4. Thread the film via the **rear guide roller on the projector head**
5. Thread the film through the **fore side guide rollers on the projector head**
6. Thread the film through the **feed sprocket**
7. Thread the film through the **film gate**
8. Thread the film through the **reverse-scan sound device**
9. Thread the film through the **bottom sprocket**
10. Thread the film through the guide rollers on the **fore side extension arm**
11. Thread the film over **fore side lever arm**
12. Put the **empty film reel** on the **fore side take-up friction shaft**

► **NOTE**

The film must be threaded through **both lever arms**.

### 5.2.1.2 General Threading through the Projector Head



- Put the full reel on the rear reel shaft and thread the film via the rear lever arm and extension arm.
- Run the film via the guide roller "Projection".
- Open the sprocket pad shoe.
  - Thread the film in the feed sprocket (all perforations engaged in sprocket teeth).
  - Close the pad shoe.
- Thread the film in the film gate.
  - Close the film pressure skate.
  - One whole frame must be centred vertically in front of the aperture opening. There is a small light inside the aperture to assist in centring.
  - Assure the film is centred horizontally between the ceramic discs.

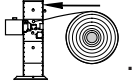



**A film loop of about 4 frames - 16 perforations (35 mm film) must be left both just above and just below the gate! If the loops are too big the film will touch stationary parts and be scratched. If the loops are too small the film may break, the image may jump, or the sound may warble.**

- Thread the film through guide rollers to the sound head and then to the bottom sprocket. The sound pressure roller may be lifted to ease threading
- Open the sprocket pad shoe.
  - Thread the film in the holdback/bottom sprocket (all perforations engaged in the sprocket teeth).
  - Close the pad shoe.
  - Verify the loop below the gate is still OK.
- Run the film via the fore side extension arm and the lever arm.
- Wind-up the film several times around the fore side take-up spool.



#### ► NOTE

When operating the projector with the handwheel, do not jerk (quickly twist) the handwheel; instead start its rotation gently and smoothly. Abusing the handwheel can break teeth from the lower CSS shaft's fibre cog.

### 5.2.1.3 Starting the Projection

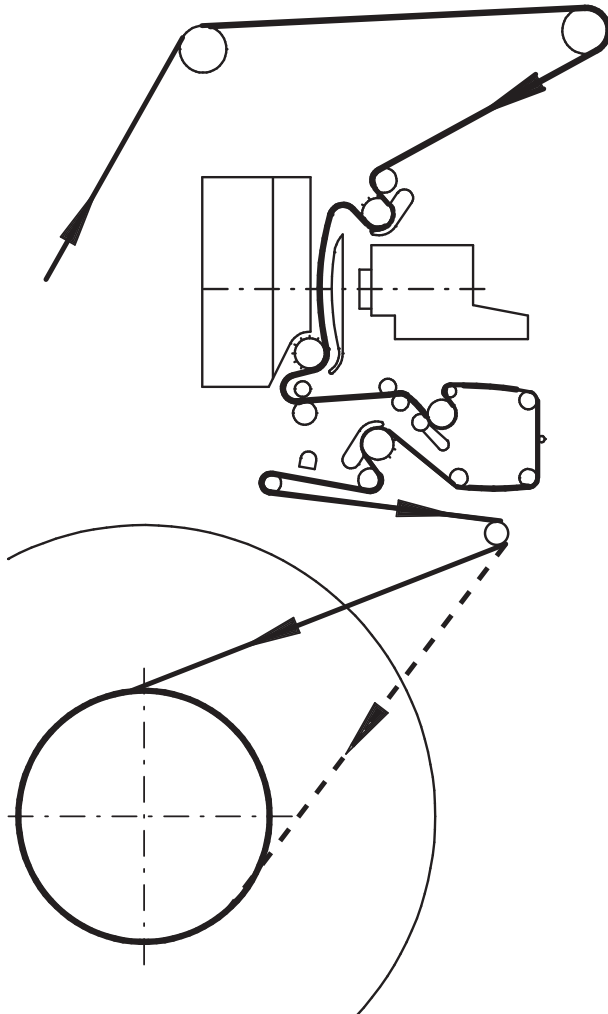
- Switch on the power supply - main switch on spool tower to position “I”.
- Position the operating mode rotary switch to .
- Adjust the spool size toggle switch depending on  (600 m) or  (- 5000 m).
- Pin up the full film spool onto the rear friction shaft (take-off friction) and an empty spool on the fore side friction shaft (take-up friction).
- Fix both spools by screwing the knurled nuts onto the shafts.
- Thread the film corresponding to the threading instructions.
- Activate the frictions, by turning manually the film spool or by tensioning the film until the lever arms reach their working positions (middle positions).
- Start the projector by pressing .

### 5.2.1.4 Ending or Stopping the Program

- Pressing  the projection can be stopped manually.
- Close the dower by pressing the  button.
- The projector switches off automatically when the film is passed, because the film break sensor is detecting no film.

## 5.2.2 FP 25 D with Spool Rack (standard with 1 friction drive)

### 5.2.2.1 Threading Overview






1. Put the **full film reel** onto the **rear friction shaft**
2. Thread the film through the guide rollers on the **rear side extension arm**
3. Thread the film via the **rear guide roller on the projector head**
4. Thread the film through the **fore side guide rollers on the projector head**
5. Thread the film through the **feed sprocket**
6. Thread the film through **film gate**
7. Thread the film through the **reverse-scan sound device**
8. Thread the film through the **bottom sprocket**
9. Put the **empty film reel** on the **fore side take-up friction shaft** and wind up film (2 - 3 windings)



#### ► NOTE

General threading through the film gate, see chapter 5.2.1.2.

### 5.2.2.2 Starting the Projection

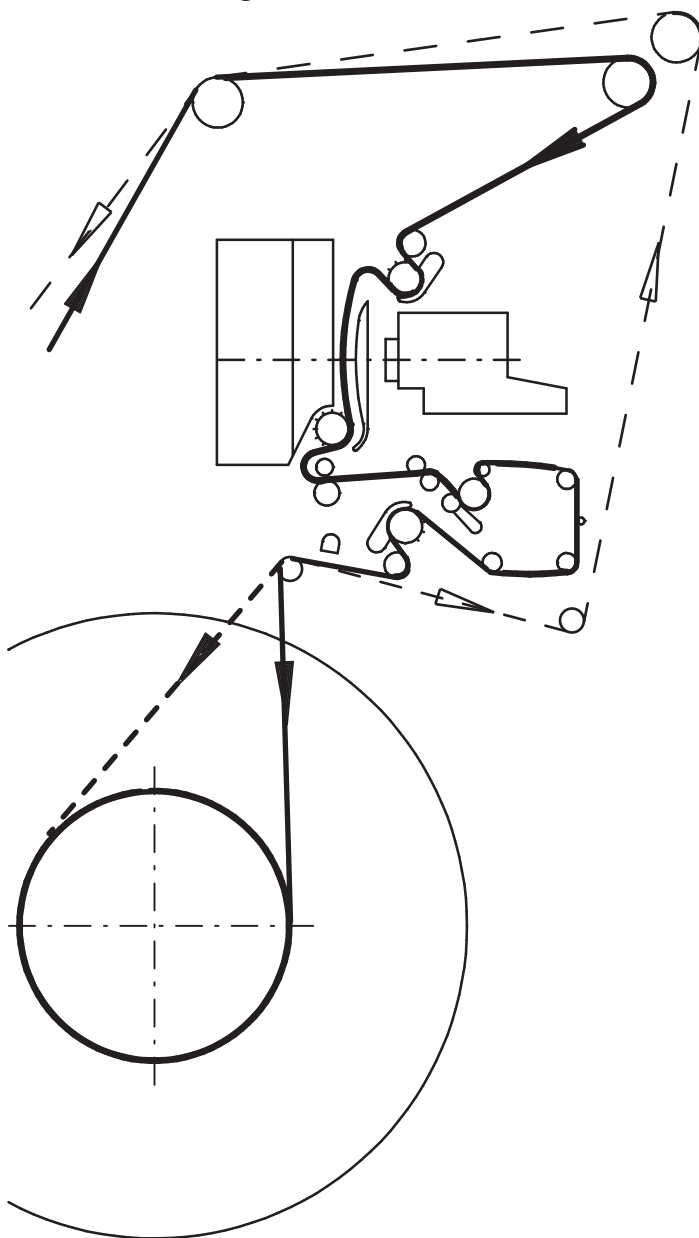
- Switch on the power supply - main switch on the spool rack in position "I".
- Pin up the full film spool onto the rear friction shaft (take-off friction) and an empty spool on the fore side friction shaft (take-up friction).
- Fix both spools by tilting the locking bar.
- Thread the film corresponding to the threading instruction.
- Switch on the friction drive - rotary switch on position "I".
- Adjust the rotary switch to the corresponding spool size  (600 m) or  (1800 to 5000 m) and to the corresponding tension direction (left or right) which depends on the spool rotation direction.
- The friction drive is activated as soon as the film is tightly positioned in front of the film break sensor.
- Start the projector by pressing .

### 5.2.2.3 Ending or Stopping the Program

- Pressing  the projection can be stopped manually.
- Close the dower by pressing the  button.
- The projector switches off automatically when the film is passed, because the film break sensor is detecting no film.

## 5.2.3 FP 25 D with Spool Rack (option with 2 friction drives)

### 5.2.3.1 Threading Overview






1. put the **full film reel** onto the **rear friction shaft**
2. thread the film through the guide rollers on the **rear side extension arm**
3. thread the film via the **rear guide roller on the projector head**
4. thread the film through the **fore side guide rollers on the projector head**
5. thread the film through the **feed sprocket**
6. thread the film through **film gate**
7. thread the film through the **reverse-scan sound device**
8. thread the film through the **bottom sprocket**
9. put the **empty film reel** on the **fore side take-up friction shaft** and wind up the film (2 - 3 windings)

#### ► NOTE



General threading through the film gate, see chapter 5.2.1.2.



### 5.2.3.2 Starting the Projection

- Switch on the power supply - main switch on spool rack to position "I".
- Pin up the full film spool onto the rear friction shaft (take-off friction) and an empty spool on the fore side friction shaft (take-up friction).
- Fix both spools by tilting the locking bar.
- Thread the film corresponding to the threading instructions.
- Switch on the friction drive - rotary switch on position "I".
- Adjust the rotary switches (Fore Side / Rear Side) to the corresponding spool size   
(600 m) or  (1800 to 5000 m) and to the corresponding tension directions (left or right) which depend on the spool rotation direction.
- The friction drive is activated as soon as the film is tightly positioned in front of the film break sensor.
- Position the rotary switch (on projector head) to Projection.
- Start the projector by pressing .

### 5.2.3.3 Ending or Stopping the Program

- Pressing  the projection can be stopped manually.
- Close the dower by pressing the  button.
- The projector switches off automatically when the film is passed, because the film break sensor is detecting no film.

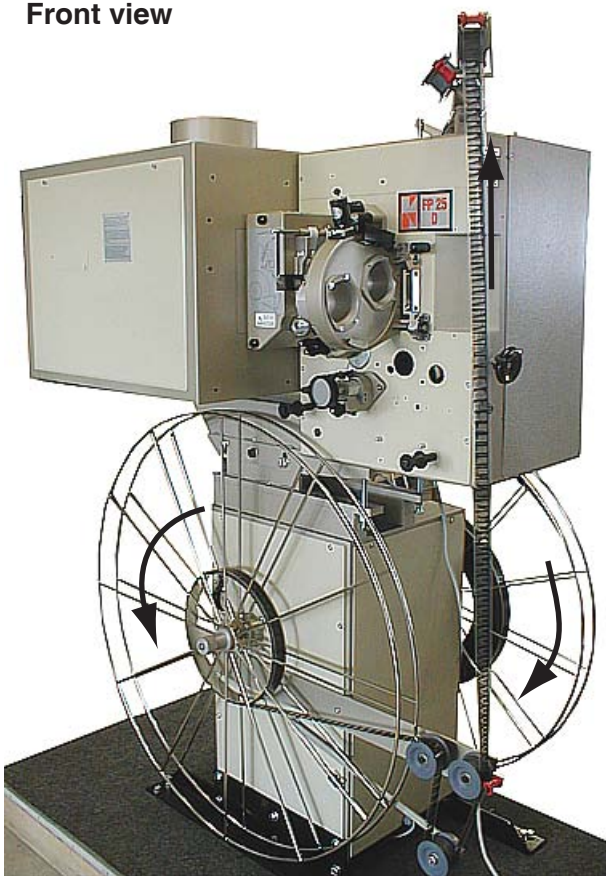
### 5.3 Rewind, Make-Up and Tear-Down a Program

► **NOTE**

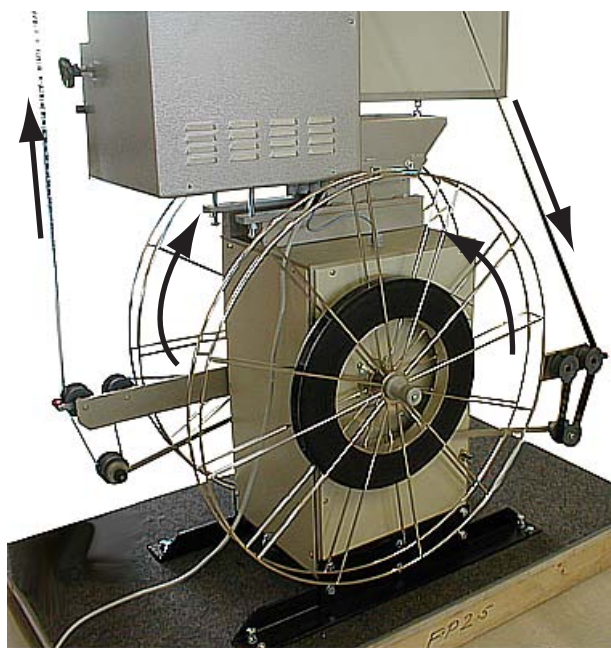
- ▷ FP 25 D with a spool tower is suitable to rewind, make-up and tear-down a program.
- ▷ FP 25 D with a standard spool rack (1 electronic friction drive) is not able to rewind, make-up or tear-down a program, you have to use, e. g. a MUR 2000/5000 motor rewriter or a UT 600/2000 rewind table.
- ▷ FP 25 D with an optional spool rack (2 friction drives) can be used to rewind a program.

#### 5.3.1 FP 25 D with Spool Tower: Make-Up, Tear-Down and Rewind Operation

**Front view**



**Back view**

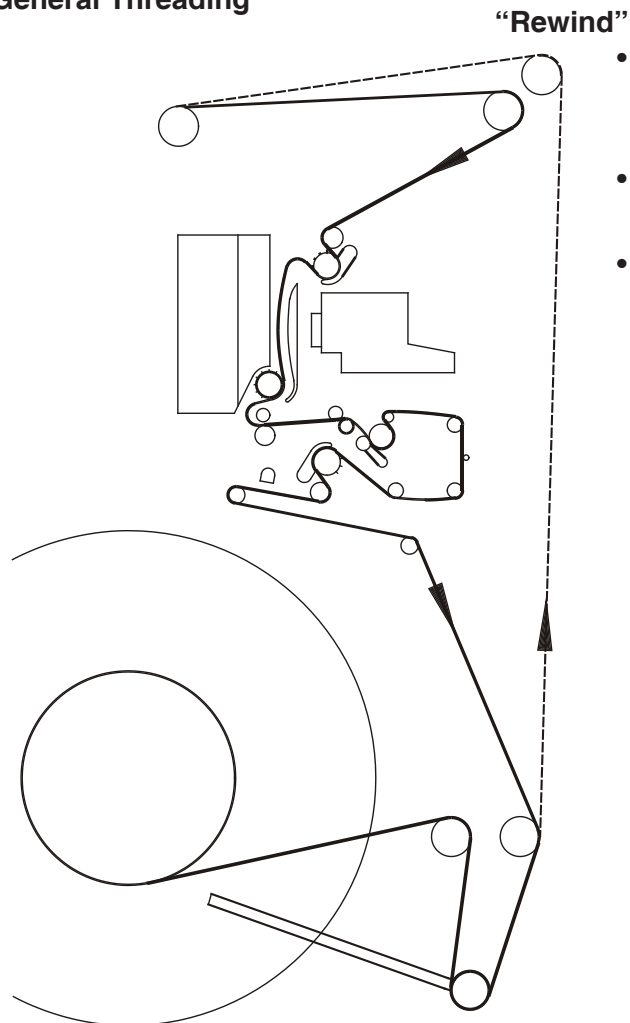


1. Put the **full film reel** onto the **fore side friction shaft**
2. Thread the film via the **fore side lever arm**
3. Thread the film through the guide rollers on the **fore side extension arm**
4. Thread the film via the **fore side guide roller on the projector head**
5. Thread the film through the rear **guide rollers on the projector head**
6. Thread the film through the guide rollers on the **rear extension arm**
7. Put the **empty film reel** on the **rear take-up friction shaft**

► **NOTE**

The film must be threaded through the **fore side lever arm** only.

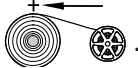


### 5.3.1.1 General Threading



- Put the full reel on the fore side reel shaft and thread via the fore side lever arm and the extension arm.
- Run film via the guide roller “Rewind”.
- Wind-up the film several times around the rear take-up spool.

Rewind Operation

### 5.3.1.2 Making Up a Program

- Switch on the power supply - main switch on spool tower to position “I”.
- Position the operating mode rotary switch to .
- Adjust the spool size toggle switch depending on  (600 m) or  (- 5000 m).
- If necessary, put a distance disk on the fore side friction shaft.
- Pin up the film spool with the first copy onto the fore side take-off friction shaft and an empty spool onto the rear take-up friction shaft.
- Fix both spools by screwing the knurled nuts onto the shafts.
- Thread the film corresponding to the threading instructions.
- Activate the frictions, by turning manually the film spool or by tensioning the film until the lever arm reaches it working position (middle position).
- Turn the speed rotary switch anticlockwise to the zero-position (left position) and wait until the green indicator LED illuminates.

- Start and accelerate the spool operation by turning the rotary switch clockwise.
- At start the green indicator LED illuminates constantly.

**ATTENTION**

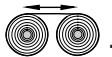


For a safe and gentle film reeling the spool operation will be activated as soon as the rotary switch was turned to zero-position.

- Splice the film beginning of the next copy with the film end of the first copy.
- Wind-up the second copy as described before.
- Do also with all other copies.

► **NOTE:**

- ▷ At the end of a copy or when a film break is detected, the operation will be switched off automatically.
- ▷ After you have made up your program, the beginning of the program is inside of the rear reel, therefore you have to rewind the whole program, see next chapter.




**5.3.1.3 Rewinding the Program**

- Switch on the power supply - main switch position "I".
- Position the operating mode rotary switch to .
- Adjust the spool size toggle switch depending on  (600 m) or  (- 5000 m).
- If the FP 25 D is equipped with the optional spool rack and two friction drives for rewinding set the rotary switch to position **Rewind**.
- If necessary, put a distance disk on the fore side friction shaft.
- Always rewind from the fore side full take-off spool to the rear empty take-up spool.
- Thread the film corresponding to the threading instructions.
- Turn the speed rotary switch anticlockwise to the zero-position (left position) and wait until the green indicator LED illuminates.
- Start and accelerate the spool operation by turning the rotary switch clockwise.
- At start the green indicator LED illuminates constantly.

**ATTENTION**

- △ For a safe and gentle film reeling the spool operation will be activated as soon as the rotary switch was turned to zero-position.
- △ The rewind operation can only be activated when the spools completely stand still. E. g. after making up the program press the stop button and wait until the spools stand still, then start rewind operation by turning the rotary switch.

#### 5.3.1.4 Tearing Down the Program

- Switch on the power supply of spool tower - main switch position "I".
- Position the operating mode rotary switch to .
- Adjust the spool size toggle switch depending on  (600 m) or  (1800 to 5000 m).
- Always tear down from the fore side full take-off spool to the rear empty take-up spool.
- Thread the film corresponding to the threading instructions and figure 2.
- Activate the take-off friction, by turning manually the film spool or by tensioning the film until the lever arm reaches it working position (middle position).
- Turn the speed rotary switch anticlockwise to the zero-position (left position) and wait until the green indicator LED illuminates.
- Start and accelerate the spool operation by turning the rotary switch clockwise.
- At start the green indicator LED illuminates constantly.



#### ATTENTION

- △ For a safe and gentle film reeling the spool operation will be activated as soon as the rotary switch was turned to zero-position.
- △ The rewind operation can only be activated when the spools completely stand still.

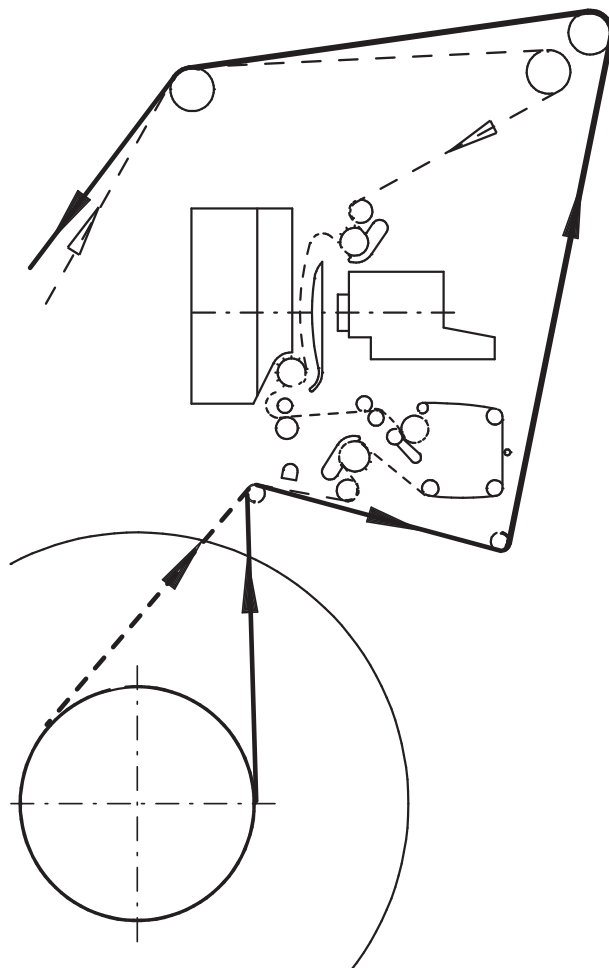
- Reduce the speed in time before the separating position of the program is reached by pressing the stop button.
- Cut the copy from the program.
- Tear-down the program until you will reach the second separating position, cut the second copy.
- Do also with all other copies.

#### ► NOTE

- ▷ After pressing the stop button the rear friction runs independently (after approx. 10 seconds), therefore the film can run out.
- ▷ To prevent that the film independently reels backwards, you have to relax the film tension at the fore side lever arm - the fore side friction will be deactivated. You can use this effect, when you have overrun the copy cutting position, to rewind to this position.





### 5.3.2 FP 25 D with Spool Rack (2 friction drives): Rewind Operation

#### 5.3.2.1 Threading Overview



1. put the **full film reel** onto the **fore side friction shaft**
2. thread the film via the **guide roller** close to the **film break sensor** and via the **guide roller** under the reverse-scan sound device
3. thread the film via the **fore side guide rollers on the projector head**
4. thread the film via the **rear guide roller on the projector head**
5. thread the film via guide roller on the **extension arm on the rear side**
6. put the **empty film reel** on the **rear side friction shaft** and wind up the film (2 - 3 windings)

#### 5.3.2.2 Rewinding the Program

- Switch on the power supply - main switch on spool rack to position "I".
- Pin up the full film spool onto the front side friction shaft and an empty spool on the rear side friction shaft (take-up friction).
- Fix both spools by tilting the locking bar.
- Thread the film corresponding to the above threading instruction.
- Switch on the friction drive - rotary switch on position "I".
- Adjust the rotary switches (Fore Side / Rear Side) to the corresponding spool size  (600 m) or  (1800 to 5000 m) and to the corresponding tension directions (left or right) which depend on the spool rotation direction.
- Tension the film manually.
- Position the rotary switch on the projector head to **Rewind**.
- Start the projector by pressing  until the friction drive turns.
- In case of an emergency the rewind operation can be stopped by pushing .



## 5.4 Troubleshooting

### 5.4.1 General Hints

Even though we produce high quality, reliable equipment, there still can be problems due to incorrect operation, poor maintenance, incorrect procedures etc.

This chapter has information about some common problems and about solving those problems. It is not possible to cover all possible problems in an operating manual; we suggest each owner develops a relationship with a competent cinema service provider.

#### ► NOTE

- ▷ Items marked (service) usually require experienced service technicians.
- ▷ Basically there are two types of errors:
  - Type 1 errors: projector won't run/stops immediately
  - Type 2 errors: errors which do not stop projector

### 5.4.2 Projector Troubleshooting Chart (Type 1 errors)

Error	Cause	Solution
Nothing works	<ul style="list-style-type: none"> <li>- main power is not available</li> <li>- loose main power connection</li> <li>- 24 V DC supply failed</li> <li>- 24 V DC fuse on main terminal blown</li> </ul>	<ul style="list-style-type: none"> <li>- check fuses or circuit breakers</li> <li>- check main power connections</li> <li>- change (service)</li> <li>- change</li> </ul>
Motor runs, pilot lamp is on, sound-head LED won't lit	<ul style="list-style-type: none"> <li>- fuse blown on LED power supply board</li> </ul>	<ul style="list-style-type: none"> <li>- check all, replace if blown</li> </ul>

### 5.4.3 Projector Troubleshooting Chart (Type 2 errors)

Error	Cause	Solution
Noisy operation	<ul style="list-style-type: none"> <li>- film is threaded incorrectly</li> <li>- chains and/or gears are worn</li> <li>- outboard intermittent bearing worn</li> <li>- intermittent movement is worn [rare]</li> </ul>	<ul style="list-style-type: none"> <li>- thread correctly</li> <li>- change</li> <li>- change (service)</li> <li>- change (service)</li> </ul>
Rollers don't turn	<ul style="list-style-type: none"> <li>- poor cleaning</li> <li>- roller worn or damaged</li> </ul>	<ul style="list-style-type: none"> <li>- clean regularly with alcohol</li> <li>- change</li> </ul>
Film break when starting the film run	<ul style="list-style-type: none"> <li>- frictions are not adjusted correctly</li> <li>- friction shafts are running dry</li> </ul>	<ul style="list-style-type: none"> <li>- adjust</li> <li>- lubricate with Cardan oil</li> </ul>
Oil leak	<ul style="list-style-type: none"> <li>- wrong oil</li> <li>- too much oil</li> <li>- oil tube / vent is blocked</li> <li>- seals are defective [clean unit with alcohol; find leak's source]</li> </ul>	<ul style="list-style-type: none"> <li>- use Kinoton 3672 oil</li> <li>- reduce oil quantity</li> <li>- clean oil tube / vent</li> <li>- replace seals (service)</li> </ul>
Foam in oil gauge glass	<ul style="list-style-type: none"> <li>- wrong oil</li> <li>- too little oil</li> </ul>	<ul style="list-style-type: none"> <li>- use Kinoton 3672 oil</li> <li>- fill oil</li> </ul>

Error	Cause	Solution
Picture moves horizontally (waves)	<ul style="list-style-type: none"> <li>- ceramic discs are blocked or dirty</li> <li>- ceramic discs are worn [rare]</li> </ul>	<ul style="list-style-type: none"> <li>- remove and clean</li> <li>- change</li> </ul>
Picture moves vertically (jumps)	<ul style="list-style-type: none"> <li>- skate pressure isn't adjusted correctly</li> <li>- skate height isn't adjusted correctly</li> <li>- film print defective [test film]</li> <li>- skate is worn</li> <li>- intermittent sprocket damaged</li> <li>- framing bushing defective</li> <li>- intermittent movement defective [rare]</li> </ul>	<ul style="list-style-type: none"> <li>- adjust</li> <li>- adjust</li> <li>- get new print</li> <li>- change</li> <li>- change (service)</li> <li>- change (service)</li> <li>- change (service)</li> </ul>
Perforation damage in direction of travel	<ul style="list-style-type: none"> <li>- skate pressure is too strong</li> <li>- intermittent or upper/feed sprocket teeth have worn</li> </ul>	<ul style="list-style-type: none"> <li>- adjust</li> <li>- change the worn sprocket(s)</li> </ul>
Perforation damage against moving direction	<ul style="list-style-type: none"> <li>- take-up friction is too strong</li> <li>- lower/holdback sprocket teeth have worn</li> </ul>	<ul style="list-style-type: none"> <li>- adjust</li> <li>- change the worn sprocket</li> </ul>
Perforation side damage	<ul style="list-style-type: none"> <li>- sprocket teeth are damaged</li> <li>- pad shoe is damaged</li> <li>- film gate position is not correct [rare]</li> </ul>	<ul style="list-style-type: none"> <li>- change sprocket</li> <li>- change pad shoe</li> <li>- adjust</li> </ul>
Scratches on film	<ul style="list-style-type: none"> <li>- film loop is too large</li> <li>- emulsion particles / dirt on rollers</li> <li>- rollers, skate, and/or film runner strips are defective or worn</li> </ul>	<ul style="list-style-type: none"> <li>- thread film correctly</li> <li>- clean</li> <li>- change the worn or defective part</li> </ul>
Picture blurring	<ul style="list-style-type: none"> <li>- shutter is not adjusted correctly</li> <li>- skate pressure too low</li> </ul>	<ul style="list-style-type: none"> <li>- adjust (service)</li> <li>- increase pressure</li> </ul>
Soft image	<ul style="list-style-type: none"> <li>- dirt on lens elements</li> </ul>	<ul style="list-style-type: none"> <li>- properly lens clean front and rear</li> </ul>
Unable to stay in focus	<ul style="list-style-type: none"> <li>- excessive heat from xenon lamp</li> </ul>	<ul style="list-style-type: none"> <li>- decrease xenon current and/or use IR heat filter</li> <li>- replace damaged IR heat filter</li> <li>- make sure light is properly distributed (no "hot spot")</li> </ul>
Misframed image	<ul style="list-style-type: none"> <li>- incorrect threading</li> <li>- misframed splices</li> </ul>	<ul style="list-style-type: none"> <li>- thread properly</li> <li>- re-make specific bad splice</li> </ul>
Automatic aperture registers imprecisely	<ul style="list-style-type: none"> <li>- aperture or operating arm was moved by hand</li> <li>- operating arm tube has been lubricated</li> </ul>	<ul style="list-style-type: none"> <li>- do not force automatic aperture.</li> <li>- If mechanism has been damaged, see service information on reducing play.</li> <li>- clean well with alcohol</li> <li>- Do not lubricate the operating arm tube.</li> </ul>

#### 5.4.4 Analog Sound

Error	Cause	Solution
No sound / some channels missing	<ul style="list-style-type: none"> <li>- sound processor failure</li> <li>- amplifier failure</li> <li>- speaker failure</li> <li>- sound device is defective</li> </ul>	<ul style="list-style-type: none"> <li>- check plugs and power; call service</li> <li>- check if sound track is threaded on the correct side</li> <li>- check / replace exciter lamp (standard sound) or red LEDs (rev. scan sound)</li> <li>- check all equipment for blown fuses / tripped circuit breakers</li> </ul>
Sound out of sync with picture	<ul style="list-style-type: none"> <li>- lower loop wrong size</li> <li>- wrong threading path</li> </ul>	<ul style="list-style-type: none"> <li>- thread correctly</li> <li>- thread correctly</li> </ul>
Loss of high frequencies	<ul style="list-style-type: none"> <li>- dirty sound optics</li> <li>- sound optics focused poorly</li> </ul>	<ul style="list-style-type: none"> <li>- clean with lens cleaner and Q-tip</li> <li>- adjust sound optics' focus (service)</li> </ul>
Garbled sound	<ul style="list-style-type: none"> <li>- scanning drum jammed</li> <li>- sound pressure roller loose</li> </ul>	<ul style="list-style-type: none"> <li>- remove blockage; change or oil bearings</li> <li>- adjust tension (service)</li> </ul>
Hissing sounds	<ul style="list-style-type: none"> <li>- scratches on sound track</li> <li>- dirt on sound track</li> <li>- defective sound electronics</li> </ul>	<ul style="list-style-type: none"> <li>- replace print</li> <li>- clean</li> <li>- check and replace (service)</li> </ul>

#### 5.4.5 Digital Sound

Error	Cause	Solution
No sound	- check the following [also see the "no sound / some channels missing" section of "Analog Sound", above.]	<ul style="list-style-type: none"> <li>- use film for digital playback</li> <li>- switch on digital sound processor</li> <li>- switch correct processor mode</li> <li>- load disk loaded correctly and check the right disk is in place [DTS only]</li> <li>- thread film correctly</li> </ul>
Sound out of sync with picture	<ul style="list-style-type: none"> <li>- loops wrong size</li> <li>- wrong threading path</li> </ul>	<ul style="list-style-type: none"> <li>- thread correctly</li> <li>- thread correctly</li> </ul>
Poor digital sound	<ul style="list-style-type: none"> <li>- improper tension</li> <li>- dirt on lens</li> <li>- dirt on digital sound track</li> <li>- scratches on digital track</li> </ul>	<ul style="list-style-type: none"> <li>- re-thread</li> <li>- remove dust using compressed air</li> <li>- clean digital soundtrack</li> <li>- replace print</li> </ul>

#### 5.4.6 Spool Tower Troubleshooting Chart

Error	Reasons	Solution
Friction drive does not run or does not run correctly	<ul style="list-style-type: none"> <li>- lever arm is not in working position</li> <li>- control function does not react</li> <li>- 5000 m spool is put on - 600 m spool is selected</li> <li>- film is threaded wrong</li> <li>- film is threaded in another way as selected</li> </ul>	<ul style="list-style-type: none"> <li>- turn spool or tension film until the lever arm moves in working position</li> <li>- check the hall potentiometer or change it (Service)</li> <li>- separate spool tower from mains for about 3 seconds and switch on again (reset)</li> <li>- select the right spool size</li> <li>- thread film correctly, see threading schemes</li> <li>- select the right operating mode</li> </ul>

#### 5.4.7 Lamphouse Troubleshooting Chart

Error	Reasons	Clearing
Nothing works	<ul style="list-style-type: none"> <li>- main power is not available</li> <li>- loose main power connection</li> </ul>	<ul style="list-style-type: none"> <li>- check fuses or circuit breakers</li> <li>- check main power connections</li> </ul>
Xenon lamp does not ignite	<ul style="list-style-type: none"> <li>- no contact</li> <li>- ignition unit is defect</li> <li>- lamphouse is open</li> </ul>	<ul style="list-style-type: none"> <li>- ignite manually</li> <li>- change (Service)</li> <li>- close lamphouse door to contact the door switches</li> </ul>
Screen lighting is uneven	<ul style="list-style-type: none"> <li>- xenon unit is not in optical axis</li> <li>- xenon bulb is not adjusted correctly</li> <li>- xenon bulb has been run too many operating hours</li> </ul>	<ul style="list-style-type: none"> <li>- call service</li> <li>- adjust</li> <li>- change xenon bulb</li> </ul>
Base cover (anode) discolored	<ul style="list-style-type: none"> <li>- electrical connections are poor</li> <li>- not enough cooling</li> <li>- not correctly adjusted optical axis</li> <li>- intensity of currents too high</li> </ul>	<ul style="list-style-type: none"> <li>- fasten contacts</li> <li>- check cooling</li> <li>- Service</li> <li>- check, adjust</li> </ul>
Bulb gets black or dark colored	<ul style="list-style-type: none"> <li>- bulb gets fractures</li> </ul>	<ul style="list-style-type: none"> <li>- change bulb</li> </ul>
Slug on the top of cathode	<ul style="list-style-type: none"> <li>- wrong polarity, wrong connection</li> <li>- wrong connection of lamphouse</li> </ul>	<ul style="list-style-type: none"> <li>- check, call Service</li> <li>- check, call Service</li> </ul>
Deformation of electrodes and lamp blackening	<ul style="list-style-type: none"> <li>restless arc</li> <li>- not in range of current control</li> <li>- alternating component is too high</li> <li>- bad or missing arc stabilization</li> <li>- bad or wrong cooling</li> </ul>	<ul style="list-style-type: none"> <li>- adjust intensity of currents</li> <li>- Service</li> <li>- Service</li> <li>- check cooling</li> </ul>
Bulb gets milky	<ul style="list-style-type: none"> <li>- life of xenon bulb is reached</li> <li>- intensity of currents is too high</li> </ul>	<ul style="list-style-type: none"> <li>- change lamp</li> <li>- adjust intensity of currents</li> <li>- remove fingerprints on xenon bulb before switching on</li> </ul>

## 6 Cleaning / Maintenance / Repair

### 6.1 General Hints



#### ATTENTION

- △ Any work on the electric supply wiring must be carried out by electricians.
- △ Make sure that nobody starts the projector while you are working on it.  
For all maintenance, cleaning and repair you must disconnect the projector from its power supply (switch off the main switch).
- △ All adjustments must be carried out by experts.

Because of using many maintenance-free parts, the consumption of material and the expenditure of time for maintenance work and repair are reduced to a minimum.

The necessary maintenance and cleaning work may be performed by the projector's operators. This work has to be carried out regularly and carefully. See the following lists regarding the schedule for this work.

### 6.2 Cleaning

#### ► NOTE

The film print should not be used oily or dirty with antiblocking agents, but always clean and dry.

#### After each show

Component	What is to do?
film path / aperture	Clean with a soft toothbrush or cloth / Blow out with air pressure.
sprockets / pad shoe	

#### Daily

Component	What is to do?
film path / aperture	Clean with a soft toothbrush or cloth / Blow out with air pressure.
sprockets / pad shoe	
lens	Clean with a lens cleaning brush.



#### ATTENTION

- △ Using air pressure can make problems, because the dirt will not be absorbed but pressed into bushings and optics.
- △ Never use sharp objects to remove particles from film path.

**Every 2 weeks**

Component	What is to do?
ceramics roller	Remove the ceramics rollers and then remove the dirt in the holes by using air pressure. Clean the ceramics roller with a alcohol moisturized cloth.

**Every 3 months**

Component	What is to do?
film break sensor	Clean the film break sensor with a soft cloth.
main drive motor / fan	Blow out the dust with pressurized air.
guide rollers	Clean the guide rollers and roller shafts with alcohol.
spool shafts	Lubricate with Esso universal oil.

**Every 6 months**

Component	What is to do?
shutter / shutter housing	Clean the shutter housing with pressurized air. Clean shutter edges with a soft toothbrush.
lens turret (if existing)	Clean the coding plates and the sensors on the sensor board with a Q-tip moisturized with Isopropyl or Isopropanol.

**ATTENTION**

Do not blow with pressurized air into the rotor - particles can be blown into the rotor and block the rotation.



## 6.3 Maintenance

### Daily

Component	What is to do?
intermittent movement	Check oil level => oil level must be between the red and the green ring, if necessary refill oil, see chapter 6.3.2.

### Every 3 months

Component	What is to do?
lens holder	Lubricate the lens holder guidance with Cardan oil, type 8657
fibre gear / shutter shaft worm	Lubricate with Kinoton EL 4854 grease.
chains	Lubricate with Esso universal oil.
aperture changer (if installed)	Clean the part of the shaft above the film path with a cloth, and the threaded part of the shaft (inside the back cover) with a brush. After cleaning lubricate the threaded part of the shaft with Klübertex BEM 43-132 or Esso universal oil. Do not lubricate the brass tube/non threaded parts of shaft!

### Every 6 months

Component	What is to do?
Reverse-scan sound device	Check O-rings on sound pressure roller. Check all rollers, whether they run easily.

### Annually

Component	What is to do?
sound reproducer	Lubricate the pressure roller ball bearings with a drop of Cardan oil, type 8657. <b>Do not use any other lubricant!</b> Lubricate the sound drum shaft with 1 drop of Esso universal oil.

### ► NOTE

- ▷ Cardan oil is very pasty therefore the ball bearings will be retarded for a proper film run. By getting move the guide roller with one finger, the roller has to stop at last after a half of turn. Otherwise you have to clean the bearing and then fill it with Cardan oil.
- ▷ You must not use any oil or grease!

water cooling (if existing)	Empty and clean and refill coolant. Check whether pump and refrigeration system are sealed and working properly.
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### 6.3.1 Drain and Refill Oil (Kinoton type 3672 oil):

- » after 50 operating hours after the first running
- » after 500 total operating hours or after a quarter of year
- » after every 4000 operating hours or once in a year, whichever comes first

### 6.3.2 Changing the Intermittent Oil

Procedure to change oil (Use Kinoton type 3672 oil only.):

- Remove the oil gauge cap and remove hose from clip. Move open end of hose down into empty container. Let the oil drain out completely. Add oil through the hose. The oil level must be between the red and green ring.
- During filling, turn the mechanism slowly, by hand, so that any air bubbles can escape. Several times turn the framing knob alternately between the left and right stops to distribute the oil. If necessary add more oil.
- Put the cap on the oil gauge and hang the hose back in the clip. There should be a vent hole in the oil gauge cap. There must not be any cap on the hose.

► **NOTE**

- ▷ The quantity of oil to fill the movement is about 6.8 fl. oz (200 ml).
- ▷ Do not overfill the intermittent.

## 6.4 Repair and Adjustments

### 6.4.1 Changing the Pilot Lamp



#### **ATTENTION**

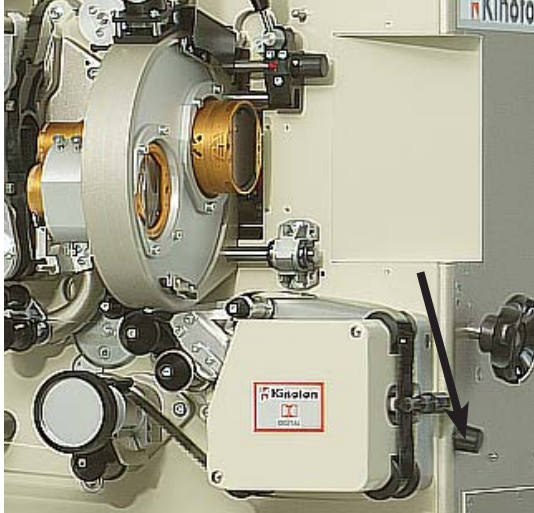
Before opening the shutter housing, wait until the shutter stands still!

- Remove the shutter housing.
- Put the screw driver behind the lamp socket and lift the lamp out of the socket.
- Push the new pilot lamp into the socket and close shutter housing.



### 6.4.2 Adjusting the Film Pressure Skate

The correct adjustment of the film pressure skate is mandatory in order to run the film easefully and steady-going and with minor wear and tear of projector and film copy.



- Reduce the skate pressure by turning the adjusting knob (arrow) such that the picture begins to shake vertically on the screen.
- The projector running noise becomes louder and more unsteady.
- Increase the skate pressure until the running noise becomes quietly and steadily and the picture steadiness is correctly.

#### ► NOTE

- ▷ Only tighten the film pressure skate as much as is absolutely necessary!
- ▷ Pressure too low: The picture shakes on the projecting screen.
- ▷ Pressure too high: The sprocket teeth, film perforations, film pressure skate and runner strips will wear excessively and film emulsion will be left in the gate
- ▷ The necessary pressure of the skate depends on the used film material.  
It is recommended to check the skate pressure again, after splices have run through the film gate and also after the film material has been changed.

### 6.4.3 Adjusting the Height of the Film Pressure Skate

The film pressure skate has to be adjusted so that it rides perfectly on the film gate and the intermittent sprocket.



- Loosen the setscrew (black arrow).
- Insert 2 superimposed film layers into the film gate.
- Screw the ball pin (white arrow) out or in to the desired length - the skate should just not be moved vertically. You can use an Allen wrench in the holes of the ball pin to rotate it.
- ➡ Without any film layers in the film gate the skate must have clear tolerance.
- When the adjustment is adjusted correctly fasten the setscrew again.

#### 6.4.4 Changing the 35 mm Film Runner Strips

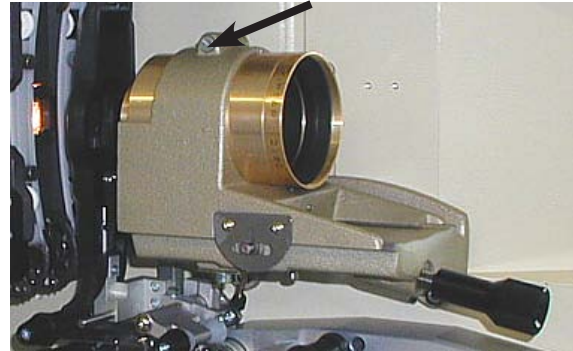


- Loosen the knurled fastening screws and remove the old runner strips and insert the new runner strips.
- ☛ They must lay in parallel to the vertical film gate edges.  
The small spring-suspended ceramic rollers must have a free clearance.
- ☛ The seat is correct, if the conic ending running strips are lying lightly on the sprocket without touching the teeth, so that a perfect film run even with splices is assured in both directions.
- Tighten the knurled screws.



#### 6.4.5 Adjusting the Lens Holder

- For setting up lenses, set scale in the mid-position.
- Loosen the clamping screw (arrow) and push the lens into the holder until picture is sharp (basic adjustment).
- Tighten the clamping screw again.
- Repeat the adjustment for each lens without turning the focus knob.
- To adjust the picture focus finally turn the knob slightly as required.



#### 6.4.6 Changing a Constant Speed Sprocket / Pad Shoe

- Loosen the locking nut (black arrow) and the adjusting nut (white arrow) of the pad shoe with the special tool – the spring will relax.
- Pull the pad shoe from its shaft.
- Loosen the film stripper setscrews (two black arrows) and remove the film stripper.
- Turn the sprocket locking screw (on sprocket surface) anticlockwise five to six turns to loosen the sprocket.
- Pull the sprocket from its shaft.



##### ► NOTE

If the teeth of sprocket are worn on one side only, you can turn it and use the other side (not with combined sprockets). Otherwise you must replace the sprocket.

- Install the sprocket onto the shaft with a slight counter-pressure on the belt wheel in the projector.
- Tighten the locking screw on the sprocket again.

##### ► NOTE

The sprocket end play should be between .0004" (0.01 mm) and .001" (0.03 mm).

- Put on the film stripper again and fasten the 2 stripper setscrews in a way that it does not touch the sprocket surface.
- Grease the pad shoe shaft with Cardan oil and then put the pad shoe onto the shaft.
- Place the torsion spring in the hole of spring cage and place the whole assembly in pad shoe again.

##### ► NOTE

Be sure that spring end is placed exactly in hole of pad shoe.



#### 6.4.7 Adjusting the Tension of the Pad Shoe Spring

- Loosen the locking screw (black arrow) with an Allen key.
- Adjust the tension of the spring by turning the adjusting ring (white arrow) clockwise with a special tool.
- The pad shoe pressure should be (measured on pad shoe with a spring scale):
  - 450 g  $\pm$  50 g at open condition and
  - 150 g to 250 g at closed condition.
- After adjustment lock the spring by tightening the locking screw (black arrow) again.

#### 6.4.8 Adjusting the Distance between Pad Shoe and Sprocket

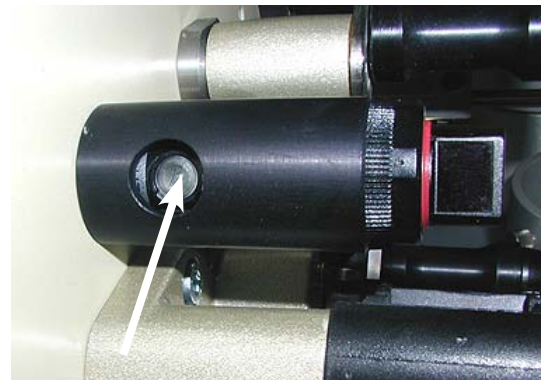
- Turn the adjusting screw (arrow) until a gap of 2 film layers is generated between the sprocket and the pad shoe.
- After adjustment paint-lock the adjusting screw.



#### 6.4.9 Adjusting the IR Reflex Film Break Sensor

Position the sensor (arrow) in a way that it "looks" vertically towards the film surface. The sensor's view must be perpendicular to the film.

- To adjust the sensitivity of the sensor thread a film and turn the plastic screw (arrow) with a screw driver until the red LED (adjusting aid) blinks.
- Then turn the screw until the LED surely lights steadily.



### 6.4.10 Tension the Chains

#### ► NOTE

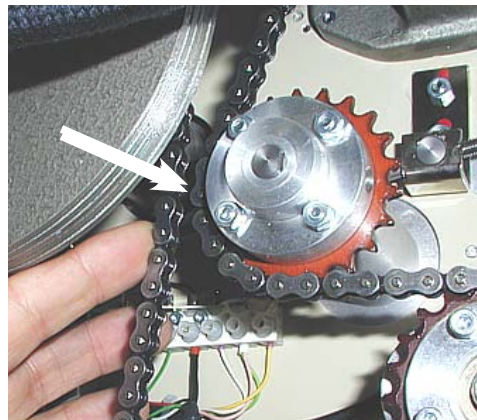
The chains must not be taut, but they must not flap during the movement. The chain should be tensioned in a way that a distance of about 1 cm remains, when the chain is pressed towards the bottom sprocket (arrow).

- Open the projector head rear cover.
- Remove the chain case by loosening the 2 Allen screws (black arrow) and then remove the hexagonal rod nuts.



#### ► NOTE

Chains should not be extremely tight; they just need to be tight enough that they can not jump over the cog teeth.



#### Upper Chain

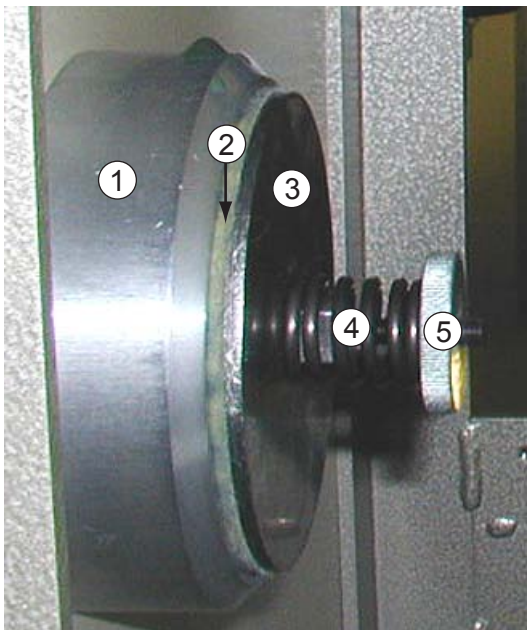


- Loosen the feed sprocket assembly by turning the Allen screw from the projector front side.
- Slide the assembly vertically until the chain is tensioned correctly.
- Then fasten the Allen screw again.

#### Lower Chain

- Loosen the centre Allen locking screw on the eccentric gear (white arrow) and move the eccentric gear until the chain tension is correct.
- Tighten the lock screw again.

#### 6.4.11 Adjusting the Mechanical Friction of the Spool Rack



- ① Friction body
- ② Felt disk
- ③ Friction disk
- ④ Spring
- ⑤ Knurled nut

Via the knurled nut the spring tension can be adjusted and therefore the pressure against the friction disk to the felt disk. Adjusting the frictions is necessary if the felt disk was replaced.

##### Adjusting the take-off friction:

- Put a full film spool onto the take-off friction shaft.  
Thread the film and run the projector.
- Stop the projector - the film should not build a loop, otherwise the friction is adjusted with too small pressure.
- Turn the knurled nut clockwise to increase the pressure onto the felt disk.

##### Adjusting the take-up friction:

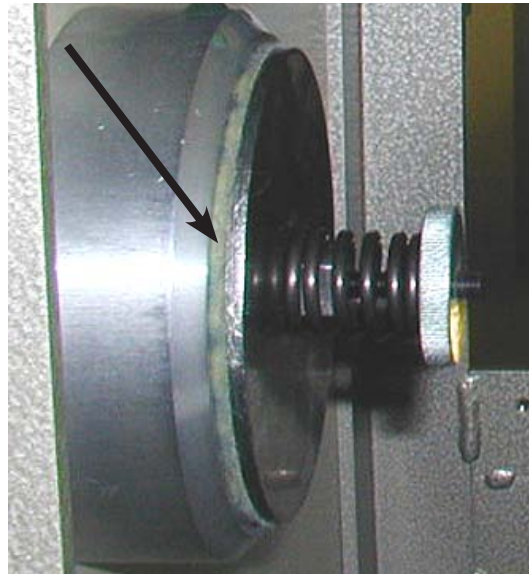
- The take-up film spool has to be nearly full, then stop the projector - the film should not build a loop.
- If necessary adjust:
  - Right turn of the knurled nut => spring increases the pressure
  - Left turn of the knurled nut => spring decreases the pressure

##### ► NOTE

- ▷ Depending on the film reel length the film tension has to be adapted.
- ▷ The film tension is inversely proportional to the reel diameter:  
The film tension is less, when the reel diameter is large (beginning of take-off friction).

#### 6.4.12 Changing and Lubricating the Felt Disk of the Mechanical Friction

- Remove the knurled nut, the spring, the friction plate and the felt disk on the friction shaft (arrow).
- Once in a year the felt disk should be put in a Cardan oil bath. If the felt disk is worn (surface is hardened) it has to be changed and oiled.
- Mount the friction again.
- Thread a film and adjust the friction (see chapter before).



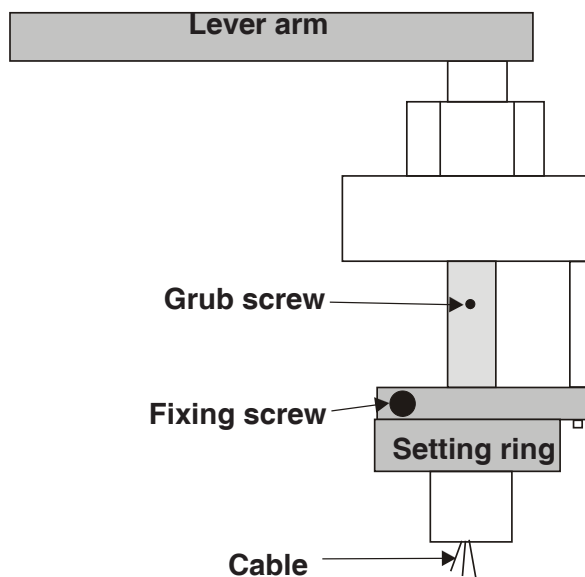
#### 6.4.13 Adjusting the Hall Potentiometer of the Lever Arm



##### ATTENTION

The Hall potentiometer should only be adjusted by experts or service personnel.

- Remove the cover of the spool tower to reach the control board.
- Connect a voltmeter to the corresponding metering points MP1, MP2 and to GND.
- Release the potentiometer fixing screw (Allen key 2.5).
- The grub screw (Allen screw 1.5) has to be tightened.
- While turning the setting ring the potentiometer can be adjusted as follows:
  - at stop position of the lever arm 0 V has to be reached (measured on M1 and M2) => LED 2 (ON=Endpos) illuminates.
  - at lever arm mid position a voltage of 2.5 V should be reached (measured on M1).
  - at the upper stop position a voltage of 5 V should be reached.



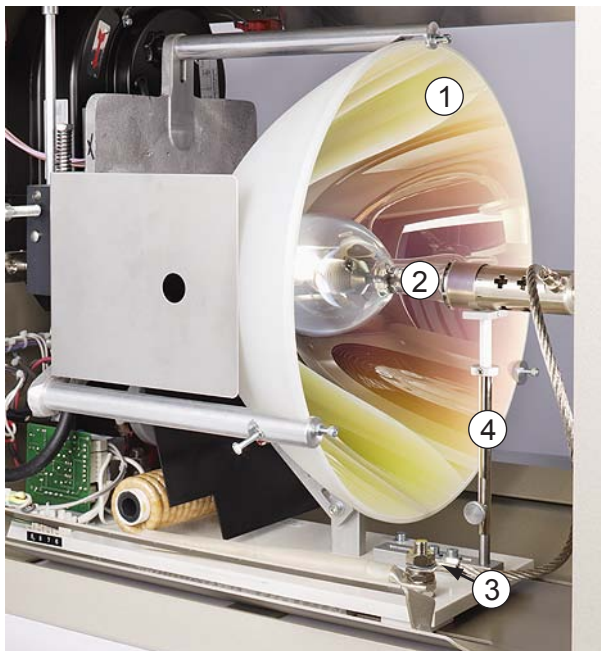


#### 6.4.14 Changing the Xenon Bulb



##### **DANGER**

- ▲ Xenon bulbs should only be changed by trained personnel.
- ▲ Xenon bulbs are high-pressure glow-discharge lamps in which a high interior pressure exists even if not in operation.
- ▲ Inserting the xenon bulb wear safety clothes, face protection and protective suit. Do not insert the xenon bulb with any violence.
- ▲ Do not insert the xenon bulb by touching it at the anode base.
- ▲ Install the xenon bulb only in its protective coat.



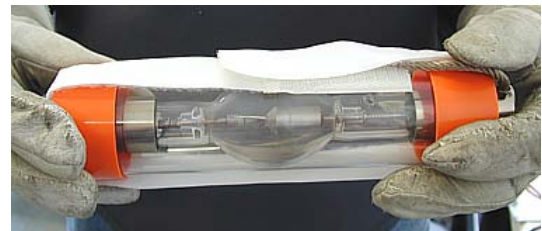
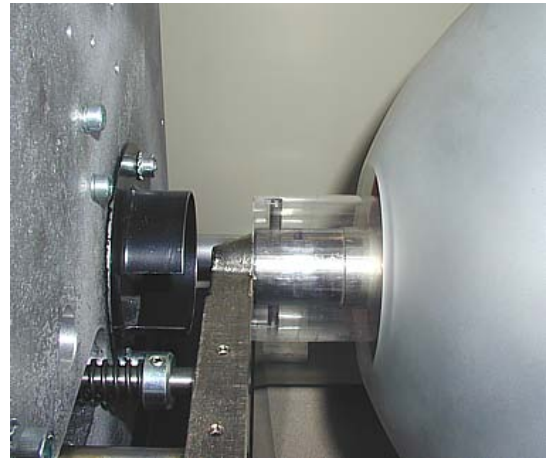
- ① Reflector
- ② Xenon bulb
- ③ Anode (+) cable connection
- ④ Bulb support (only in big lamphouses)

- Remove the lamphouse door, by loosening the 2 Allen screws.
- Remove the anode cable from the lamphouse connecting bolt.



**Up to 2000 W xenon bulbs:**

- Put the protection coat over the bulb - thread the anode cable through the coat opening and shove the protective coat to the bulb's socket such the coat slits slide over the socket's pin.
- Unscrew the bulb by turning the protective coat.
- Pack the used xenon bulb as shown in figures.
- Open the protective coat cap of the new xenon bulb and screw the bulb in its protective coat into the lamphouse socket.
- Remove the protective coat and connect the anode cable to the lamphouse socket.
- Close the lamphouse door.





**Up to 7000 W xenon bulbs:**

- Loosen the bulb support and put it down.
- Put the protective bonded fabric or a strong cloth around the unpacked bulb.
- Loosen the bulb fixing screw with an Allen key through the lamphouse opening.
- Remove the bulb and then the adapter on the bulb socket by loosening the fixing screw.
- Pack the used xenon bulb.
- Fasten adapter onto the new xenon bulb (arrow) - bulb is packed in protective bonded fabric.

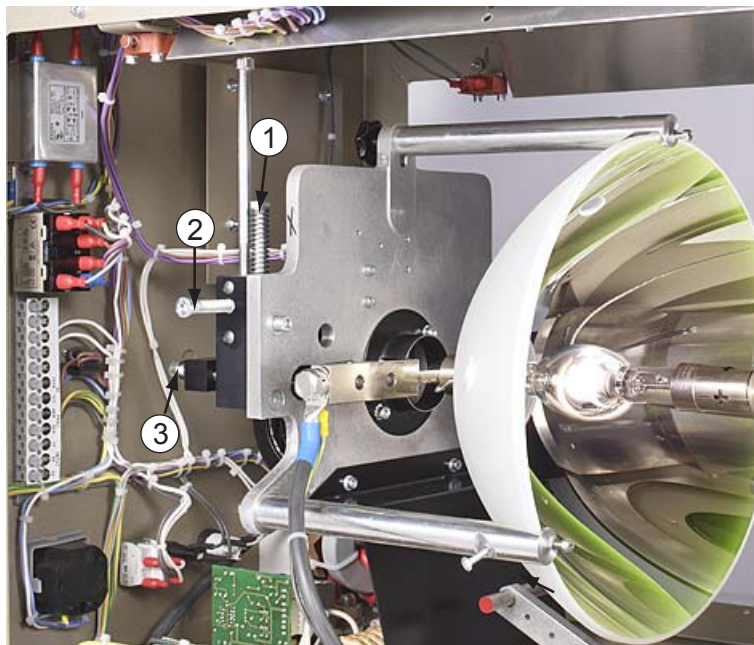


- Thread the xenon bulb through the central mirror hole and fasten it by tightening the Allen screw from the lamphouse outside.  
Before inserting the 7,000 W bulb, turn the axial adjustment so far as possible in forward direction to get more space.
- Remove the protective coat and connect the anode cable to the lamphouse socket.

**ATTENTION**

- △ Position the anode cable away from any metal components as far as possible especially when inserting xenon bulbs with 40 cm anode cable.
  - △ Do not mechanically stress the anode cable to avoid bulb explosion.
- ☛ The bulb support stays down for adjusting the screen illumination.
- Close the lamphouse door.

#### 6.4.15 Adjusting the Illumination of Screen



① Vertical adjustment

② Horizontal adjustment

③ Axial adjustment

The xenon bulb's position can be adjusted relatively to the mirror in three axes (horizontal, vertical and axial).

- Insert the CS lens.
- Start the projector and select the CS format. Immediately check the intensity of currents, if necessary adjust, see next chapter.
- Using an Allen wrench on ③, the xenon lamp can be adjusted as much along the optical axis until only a reduced round illuminated spot can be seen on the screen (focal length adjustment).
- By turning the adjusting screws right – left (horizontally) ② and up – down (vertically) ① you bring this light spot precisely into the middle of the screen.
- Turning the adjusting screw ③ (axial) you draw up the spot until the screen illumination is even. If necessary adjust the horizontal and vertical axis again.
- Switch off the projector and within the lamphouse.
- Open the lamphouse after a waiting period of at least 10 minutes.
- Adjust the bulb support to the anode base.
- The bulb support should barely touch the anode base - leave 1/10 mm space for the expansion of the hot xenon bulb.

► **NOTE**

If there is no visible gap between the anode and the bulb support, but it is still possible to slide a piece of paper between them, the bulb support is adjusted properly.

#### 6.4.16 Adjusting the Intensity of Currents

► **NOTE**

- ▷ Read the data sheet which is delivered with xenon bulb. The bulb manufacturer's own data should be used.
- ▷ Read also rectifier's operating manual.

The intensity of currents associated to the installed xenon bulb can be adjusted on the rectifier. The control can be operated by a potentiometer, a hand wheel, bridges, etc.

Lamp Capacity [W]	Typical Current [A]	Max. Current [A]
1000	50	55
1600	65	70
2000	70	85
2500	90	100
3000	100	110
4000	135	150
5000	140	150
7000	160	165

#### 6.4.17 Checking the Light Arc Stabilizing Magnet

A magnet stabilizes the arc between cathode and anode. An even well adjusted light arc provides a good optical efficiency and increase the life of the xenon lamp.



**DANGER**

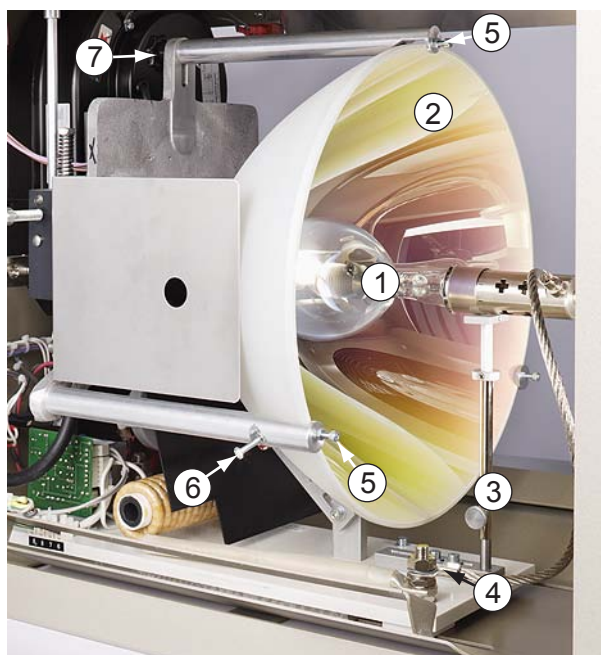
- ▲ An adjustment can only be carried out by service personnel.
- ▲ An adjustment can only be carried out when xenon lamp is on. Therefore this adjustment requires special protective equipment.
- ▲ Adjustment must be carried out with a special welders' mask and suitable protective equipment.

### 6.4.18 Changing the Reflector

#### ► NOTE

- ▷ The reflector should only be changed by the projectionist in case of need.  
At the next opportunity the reflector should be adjusted finely by service personnel who has the necessary alignment tool.
- ▷ At normal case the reflector should be changed and adjusted by service personnel.
- ▷ The following chapter describes how the reflector can be changed in case of need.

- ① Xenon bulb
- ② Reflector
- ③ Bulb support (only big lamphouses)
- ④ Anode connecting bolt
- ⑤ Adjusting/fixing screws
- ⑥ Counterscrew
- ⑦ Handle star



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#### **DANGER**

Observe the safety instructions, when opening the lamphouse.

- Switch off the projector.
- Wear protective clothes.
- Open the lamphouse only after waiting period of at least 10 minutes.

#### **Removing the Reflector**

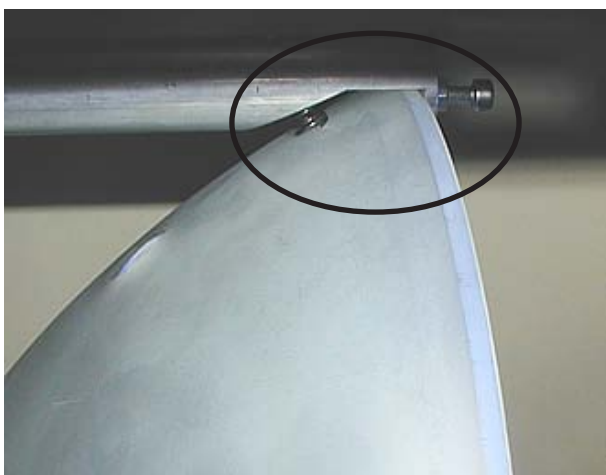
- Remove the lamphouse door.
- Remove the xenon bulb.
- Loosen the upper holder rod by turning the handle star ⑦.
- Carefully take out the reflector by tilting it forwards while the upper holder bar is moved upwards.
- At this opportunity clean lamphouse by blowing compressed air in the lamphouse and finally remove the dust with a vacuum cleaner.

### Mounting the Reflector

- Put down the reflector onto the lower holders.
- Move the upper holder bar over the reflector and carefully put it down on the reflector edge.
- ☛ Installing the reflector look for the inspection window in the reflector. It must face to the operator side.



- ☛ The reflector edge must be positioned exactly in the three holders.
- ☛ In the upper holder the reflector should have about 1 mm distance to the holder and the spring should lay evenly on the reflector surface.



### Coarse Adjustment



- The reflector can be adjusted by turning the adjusting screws on the reflector holder bars.
- Adjust the space between the reflector set screws and the reflector surface to 0.2 mm. The set screws (black arrow) prevent the reflector from sliding back into the reflector holder rods.  
Pushing the reflector towards the holder rods the set screws should stop it at 0.5 to 1 mm movement.



#### ATTENTION

The set screws must not touch the reflector surface if properly adjusted. Due to mechanical strain the reflector may break if not properly adjusted.

- Tighten the handle star on the upper mirror holder.



#### ATTENTION

Be careful that the main reflector will not be clamped too toughly - during the operation the reflector expands and therefore could break.



#### NOTE

The fine adjustment has to be carried out by service from Kinoton.

- Insert the xenon bulb.
- Close the lamphouse.
- Adjust the screen of illumination



#### 6.4.19 Changing the Heat Filter



##### ATTENTION

The heat filter is a reflection filter, therefore you have to watch out for the reflection side of filter to be directed to xenon lamp (marked with a black dot).

- Remove the old filter.

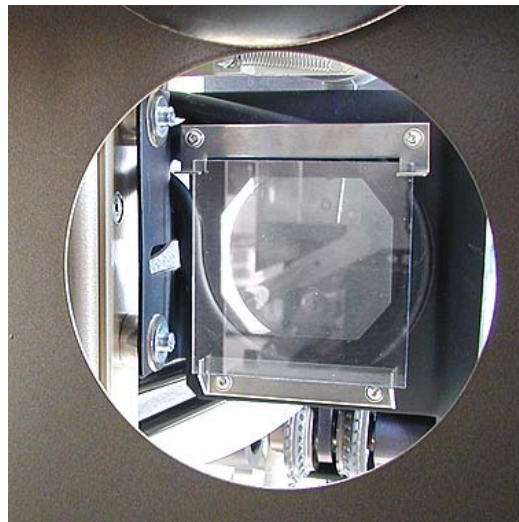
##### In Lamphouse

- Open the lamphouse.
- Put the heat filter onto the holders.
- Close the lamphouse.



##### In Film Gate

- Remove the shutter housing.
- Put the heat filter into the slits of the holders.
- Close the shutter housing.





## 7 Parts and Wearing Parts

### 7.1 Projector Head

#### 7.1.1 Film Gate Parts

Part	Fig.	Code number
Film runner strip white	<b>1A</b>	5322 463 10021
Film runner strip Novotex brown	<b>1B</b>	5322 463 10023
Knurled screw for film runner strip fastening	<b>1C</b>	5322 505 10336
Ceramics roller	<b>1D</b>	5322 532 50362
Film pressure skate black	<b>1E</b>	1000 463 17019
Film pressure skate brown (longlife)	<b>1F</b>	5322 463 10019

#### 7.1.2 Feed/Bottom Sprocket Parts

Part	Fig.	Code number
Pad shoe	<b>2A</b>	5322 525 30003
Nut for pad shoe	<b>2B</b>	5322 462 50027
Spring left for pad shoe	<b>2C</b>	5322 492 40001
Hand wheel for bottom sprocket	<b>3A</b>	1000 413 47005

#### 7.1.3 Guide Roller Parts

Part	Fig.	Code number
Large guide roller Ø 34 mm	<b>4A</b>	1000 525 37042
Cap	<b>4B</b>	5322 462 70374
Guide roller Ø 20 mm	<b>4C</b>	1000 525 67054
Cap	<b>4D</b>	5322 462 70373
Grey guide roller with ball bearing and stay roller	<b>4E</b>	1000 525 37041
Grey guide roller with ball bearing	<b>4F</b>	1000 525 67028

#### 7.1.4 Other Parts on Projector Head

Part	Fig.	Code number
Knurled screw for shutter housing	<b>4G</b>	5322 505 10192
Focusing knob	<b>4H</b>	1000 413 37001
Skate pressure adjusting knob	<b>4K</b>	1000 413 37001
Framing adjusting knob	<b>4L</b>	5322 413 10007
Knurled screw for lens fastening (M 4 x 8)	<b>4M</b>	1000 502 17004
Film cleaner		0040 060 0048X
Esso universal oil EL 4805, 100 ml		1000 390 27008
Grease for rolling bearing, 8 g		1000 390 27003
Pilot lamp, 24 V / 3 W		0040 120 00059
Fuse 6.3 AT		4822 253 30031

Figure 1

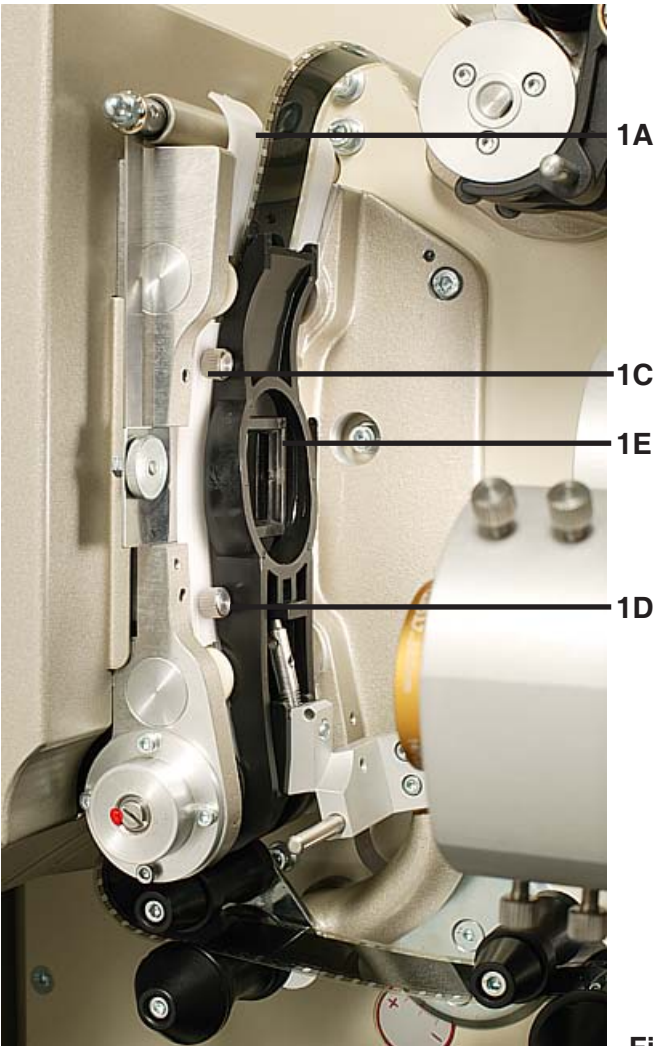


Fig. 1A



Fig. 1B



Fig. 1C



Fig. 1D



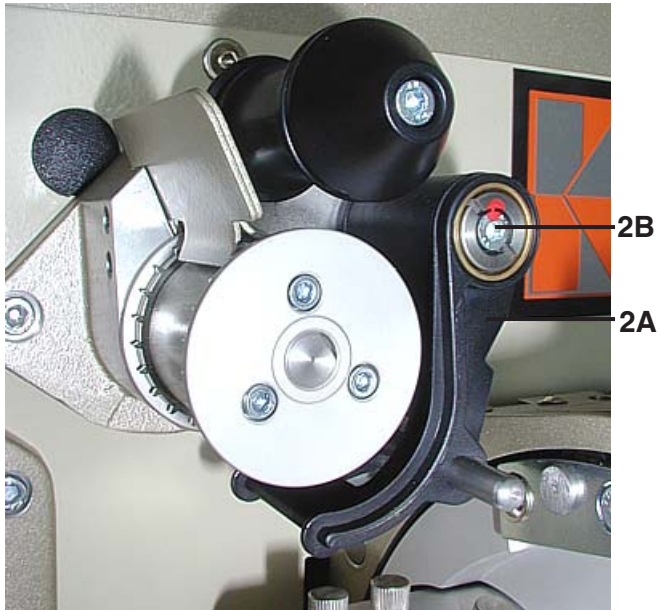
Fig. 1E



Fig. 1F



**Figure 2**



**Fig. 2A**



**Fig. 2B**



**Fig. 2C**



**Figure 3**



**Fig. 3A**





Figure 4

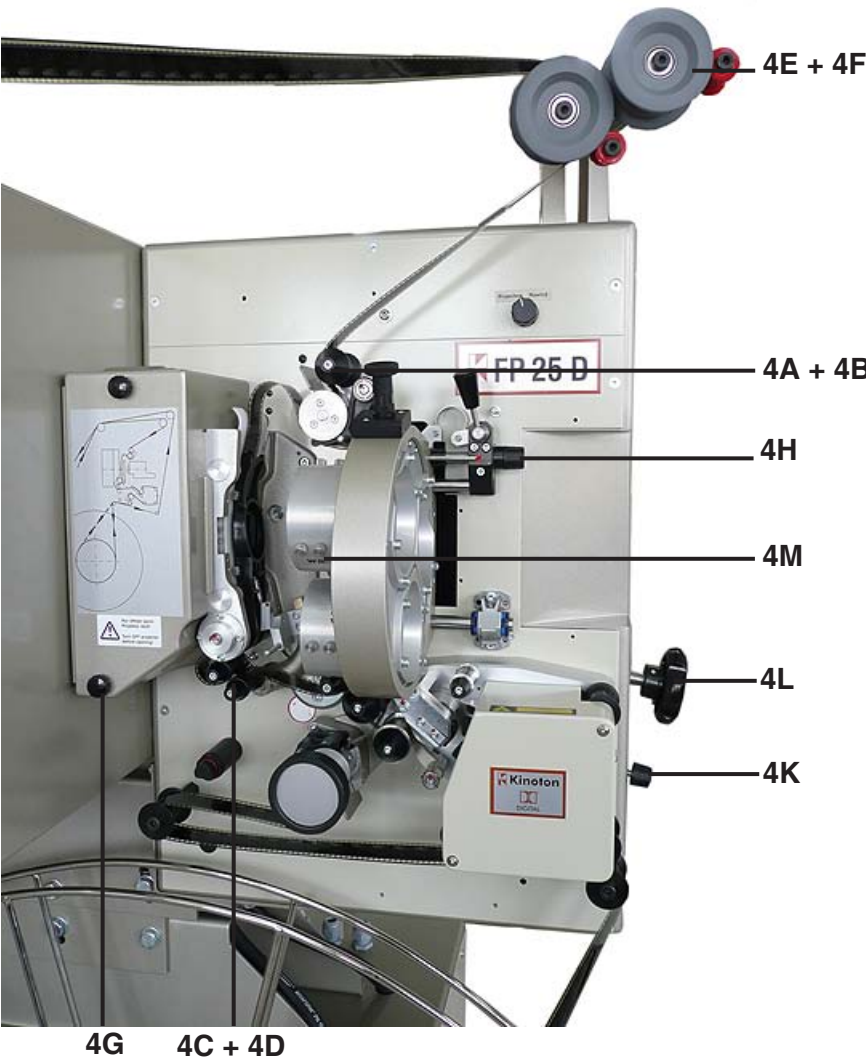


Fig. 4A



Fig. 4B



Fig. 4C



Fig. 4D



Fig. 4F

Fig. 4G



Fig. 4E



Fig. 4M





### 7.1.5 Parts for Projector Drive

Part	Figure	Order Number
Oil hose	5	5322 530 20236
Oil gauche glass	6	5322 532 70114
Projector oil 3672/00, 1 L		1000 390 27006

Figure 5



Figure 6



### 7.1.6 35 mm Apertures for Aperture Changer

Part	Code Number
Triple aperture shaped	1000 451 17012
Triple aperture for filing	1000 451 17016
Hole aperture to adjust the frame center	1000 451 17017
Triple aperture dimension smaller than specified	1000 451 17020
Hole aperture for filing	1000 451 17022

### 7.1.7 Single Apertures

Part	Code Number
single aperture complete CS 2.35:1	5322 451 10009
single aperture complete NS 1.37:1	5322 451 10011
single aperture complete 1.85:1	5322 451 10012
single hole aperture complete	5322 451 10013
single aperture for silent movies	1000 451 17014
single aperture complete Super 35 mm	1000 451 17015
single aperture finished size 1:1.37	1000 451 17023
single aperture finished size 1:1.66	1000 451 17024
single aperture finished size 1:1.85	1000 451 17030
single aperture finished size 1:2.39	1000 451 17034
single aperture S35/1:2.39	1000 451 17029
single aperture CS+1:1.66	1000 451 17031
single aperture S35/1.1.85	1000 451 17032
single aperture S35/CS	1000 451 17033

### 7.1.8 Adapter Rings for 35 mm Lenses

Part	Code Number
adapter ring 1 for ISCO Cinemascope Ultra-Star 55 / 60	0070 410 00003
adapter ring 2 for Schneider Super-Cinelux 50 / 52,5 / 55 / 57.5 / 60 ISCO Ultra-Star HD 42 / 45 / 48 / 50 / 55 / 60 / 65 / 70 / 75 / 80 / 85 / 90 / 95 ISCO Ultra-MC 35 / 45 / 50 / 55 / 60 / 65 / 70 / 75 / 80 / 85 / 90 ISCO Cinemascope Ultra-Star 50	0070 410 00018
adapter ring 3 Schneider Super-Cinelux 28 / 30 / 32.5	0070 410 00015
adapter ring 4 Schneider Super-Cinelux 42.5 / 45 / 47.5	0070 410 00017
adapter ring 5 Schneider Super-Cinelux 35 / 37.5 / 40	0070 410 00016
adapter ring 6 ISCO Cinemascope Ultra-Star HD 29 / 32 / 35 / 38 / 40	0070 410 00001
adapter ring 7 ISCO Cinemascope Ultra-Star HD 95 / 100	0070 410 00002
adapter ring 8 Schneider Super-Cinelux 2 / 90	0070 410 00019
adapter ring 9 ISCO Ultra-Star-Plus 2.1 37.5/ 40/ 45	0070 410 00013
adapter ring 10 ISCO Ultra-Star-CS	0070 410 00014
adapter ring 11 Schneider Super-Cinelux 2/ 95	0070 410 00009
adapter ring 70.6 / 62.5	0070 410 00010

## 7.2 Spool Tower

### 7.2.1 Guide Rollers

Spare Part / Name	Figure	Order Number
Guide roller with ball bearing and stay roller	<b>7A</b>	1000 525 37041
Guide roller with ball bearing	<b>7B</b>	1000 525 67028
Guide roller with ball bearing and 2 stay rollers		1000 525 37006

### 7.2.2 Film Spools

Spare Part / Name	Figure	Order Number
Film spool 600 m Ø 9 mm		0040 060 00050
Film spool 1800 m, Achse Ø 12.7 mm		0040 060 00765
Film spool 2000 m, Achse Ø 12.7 mm		0040 060 00770
Film spool 3200 m, Achse Ø 12.7 mm	<b>7B</b>	0040 060 00078
Film spool 4000 m, Achse Ø 12.7 mm		0040 060 00080
Film spool 5000 m, Achse Ø 12.7 mm		0040 060 00073

### 7.2.3 Friction Shafts

Spare Part / Name	Figure	Order Number
Interchangeable flange, shaft Ø 12.7 mm for 35 mm film with treading and locking nut	<b>8</b>	1000 535 77018
Friction shaft Ø 12.7 mm	<b>8A</b>	1000 535 77020
Locking nut	<b>8B</b>	1000 413 47003
<b>Note:</b> friction shafts with other diameters are available on request.		

### 7.2.4 Other Parts

Spare Part / Name	Figure	Order Number
Flange with bearing bushing	<b>9</b>	1000 693 57051
Weight for lever arm	<b>10</b>	1000 404 57046

Figure 7

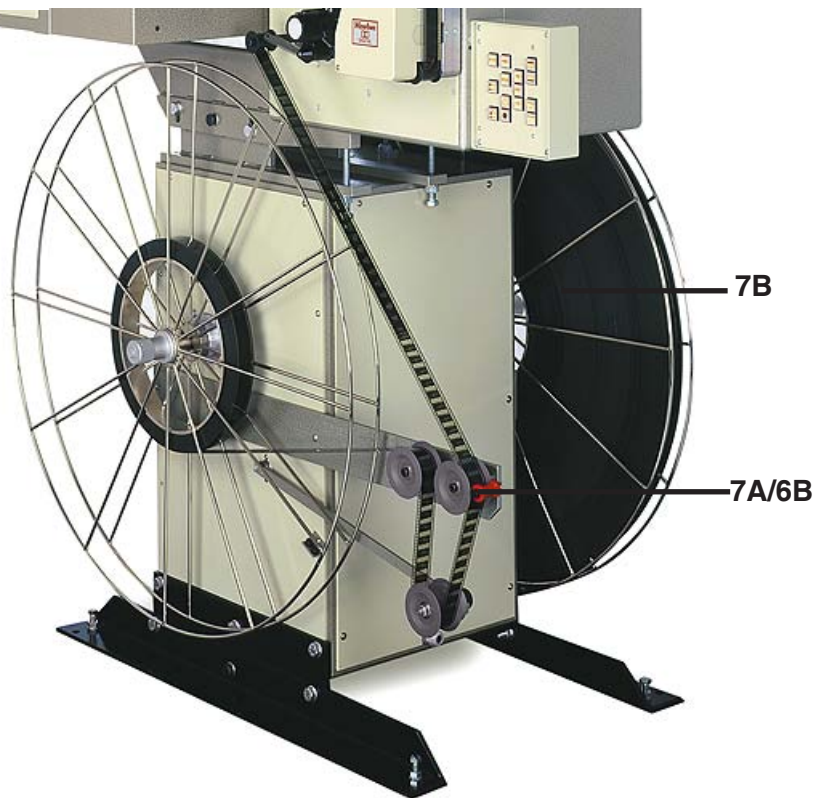


Fig. 7A

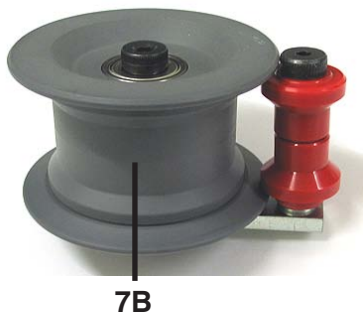


Figure 8

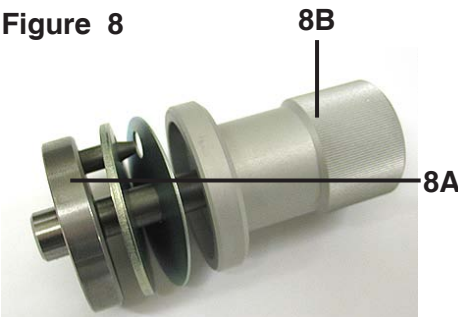


Fig. 8a



Fig. 8B



Figure 9



Fig. 7B



Figure 10



## 7.3 Spool Rack

### 7.3.1 Film Spools

Spare Part / Name	Order Number
Film spool 600 m Ø 9 mm	0040 060 00050
Film spool 1800 m, Achse Ø 12.7 mm	0040 060 00765
Film spool 2000 m, Achse Ø 12.7 mm	0040 060 00770
Film spool 3200 m, Achse Ø 12.7 mm	0040 060 00078
Film spool 4000 m, Achse Ø 12.7 mm	0040 060 00080
Film spool 5000 m, Achse Ø 12.7 mm	0040 060 00073

### 7.3.2 Friction Shafts or Interchangeable Flange with Shaft

Spare Part / Name	Figure	Order Number
Interchangeable flange, shaft Ø 12.7 mm for 35 mm film with treading and locking nut		1000 535 77018
Locking nut		1000 413 47003
Friction shaft Ø 12.7 mm	<b>11A</b>	1000 535 77020
<b>Note:</b> friction shafts with other diameters are available on request.		

### 7.3.3 Parts for Friction Drive

Spare Part / Name	Figure	Order Number
Felt disk 4000 m for mechanical friction	<b>12A</b>	1000 532 57007
Spring for mechanical friction	<b>12B</b>	5322 492 50064
Knurled nut for mechanical friction	<b>12C</b>	5322 505 10049

Figure 11

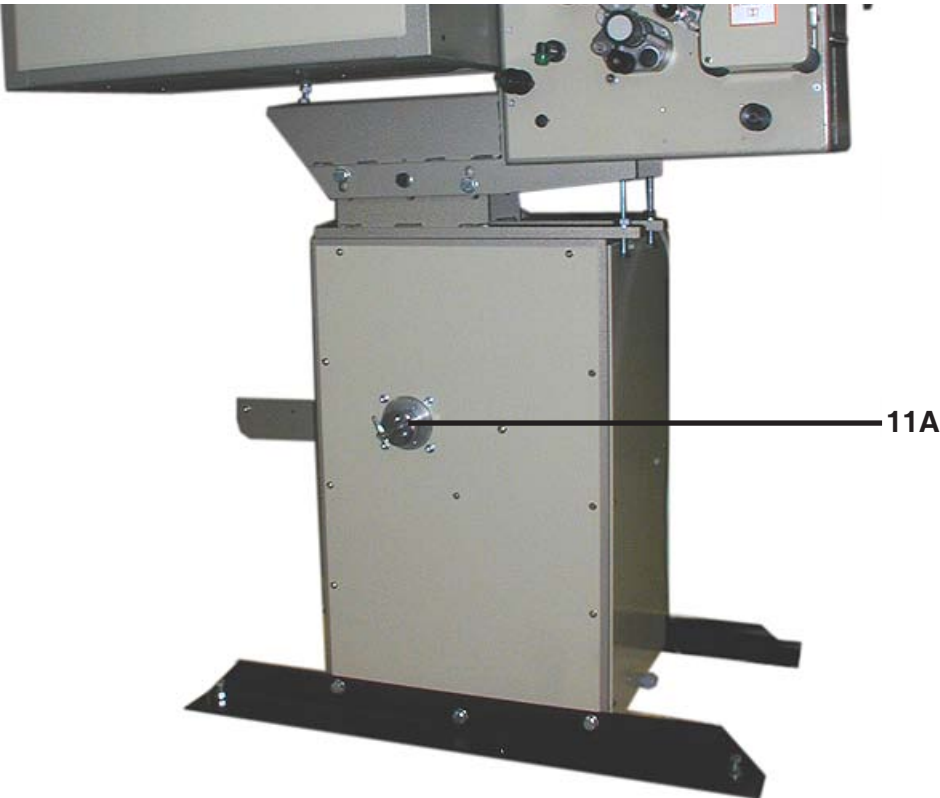


Figure 12

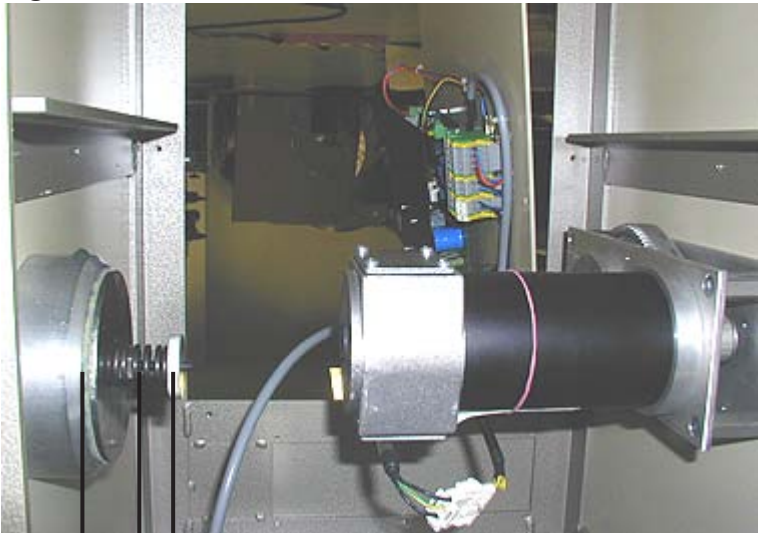


Fig. 12A



Fig. 12B

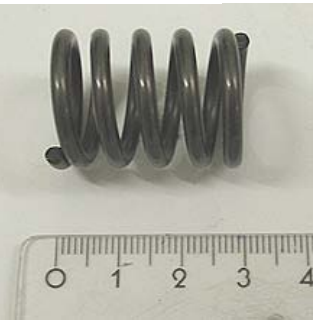


Fig. 12C





## 7.4 Lamphouse

### 7.4.1 Xenon Lamps, Accessories and Adapters

Parts	Fig.	Order No.
<b>Note:</b> Xenon bulbs, on request		
Bulb support for xenon bulbs 2000 W - 7000 W	<b>13A</b>	1000 404 57011
Insulated stick for bulb support	<b>13A / 13B</b>	1000 535 97011
Bulb carrier for xenon bulbs 2000 W - 7000 W	<b>14</b>	1000 404 57058
Bulb carrier for xenon bulbs 1000 W - 2000 W	<b>15</b>	1000 404 57059
Adapter for 1000 W/HSC, 1600 W/HSC, 2000 W	<b>16</b>	1000 404 57021
Adapter for 2000 W	<b>17</b>	1000 404 57017
Adapter for 2000 W/HS, 2500 W/HS, 3000 W/HS	<b>18</b>	1000 404 57018
Adapter for 3000 W/H	<b>19</b>	1000 404 57019
Adapter for 3000 W/HP digital console	<b>20</b>	1000 404 57015
Adapter for 4000 W/HS, 5000 W/HBM, 7000 W/HS	<b>21</b>	1000 404 57020
Adapter for 5000 W/H	<b>22</b>	1000 404 57044
Adapter for XBO 3000 W/HTP, 4000 W/HTP, 4500 W/HTP, 5000 W/HTP, 6000 W/HTP	<b>23</b>	1000 404 57035
Adapter for 2000 W/HTT		1000 404 57030
Adapter for 3600 W/HTM		1000 404 57031

### 7.4.2 Heat Filters

Parts	Fig.	Order No.
Heat filter 20 x 20 B	<b>24A</b>	0025 760 70213
Leaf spring for heat filter (20 x 20 B) holder	<b>24B</b>	1000 492 97007
Heat filter 7,8 x 7,8 for mounting into the film gate	<b>25A</b>	0025 760 70216
Holder for heat filter 7.8 x 7.8	<b>25B</b>	1000 463 57006

### 7.4.3 Other Mechanical Parts

Parts	Fig.	Order No.
Retaining spring, horizontal adjustment	<b>26A</b>	1000 492 37002
Retaining spring, vertical adjustment	<b>26B</b>	1000 492 37004
Retaining spring, axial adjustment		1000 492 37003
Cover plate Ø 60 mm for lamphouse		1000 532 57009

### 7.4.4 Adjusting Tool and Safety Package

Parts	Fig.	Order No.
Adjusting projector		1000 395 37003
Safety package XENON (face shield, gloves)		1000 395 37004
Kevlar safety jacket		0040 240 00082

Figure 13

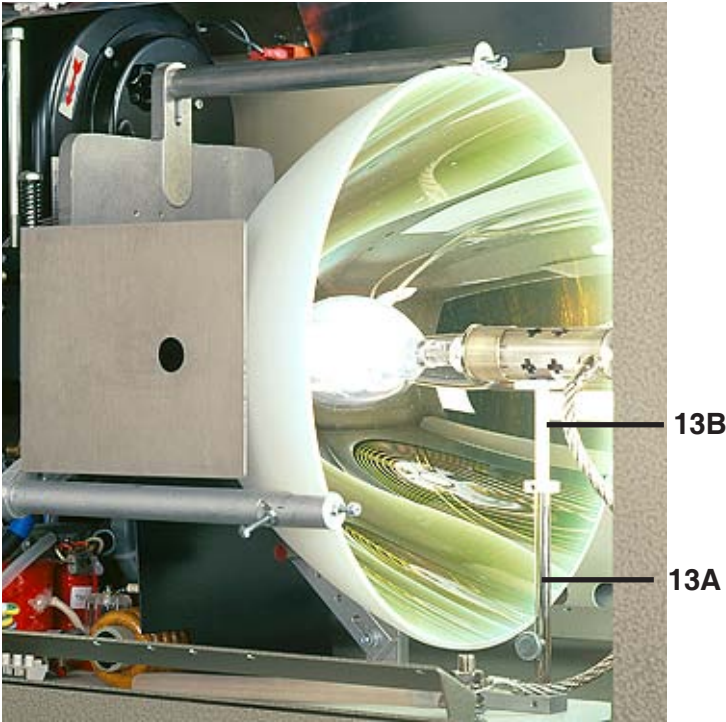


Fig. 13A

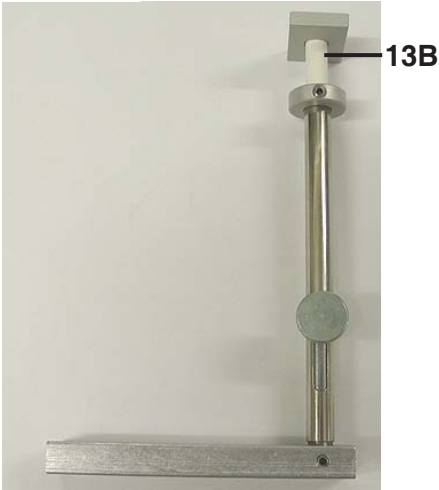


Fig. 13B



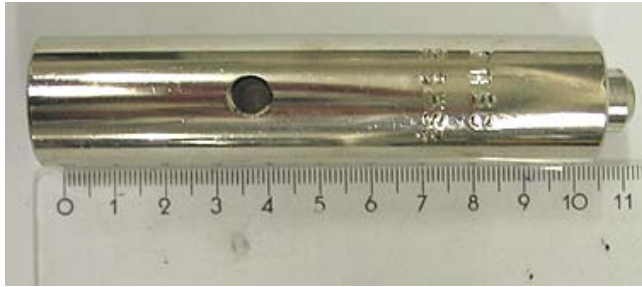
Figure 14



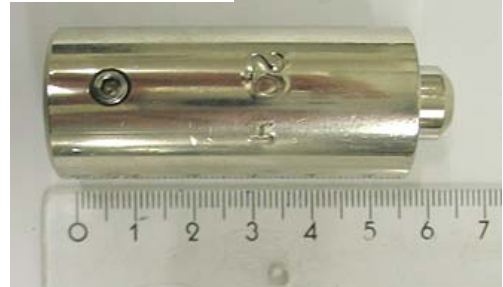
Figure 15



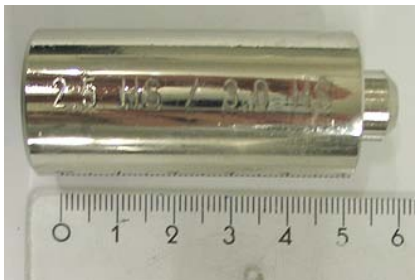
**Figure 16**



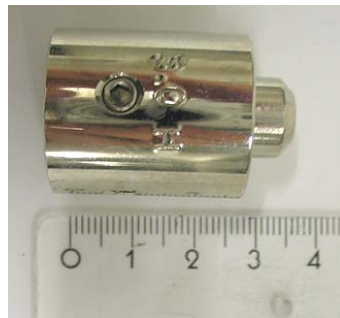
**Figure 17**



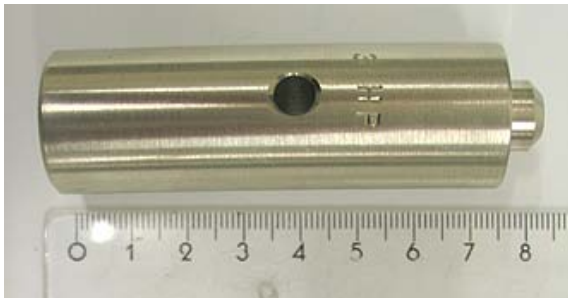
**Figure 18**



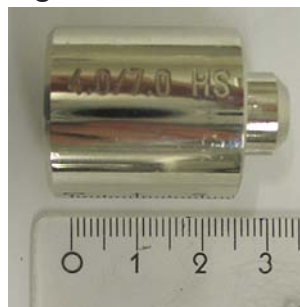
**Figure 19**



**Figure 20**



**Figure 21**



**Figure 22**



**Figure 23**



Figure 24



Fig. 24B



Figure 25

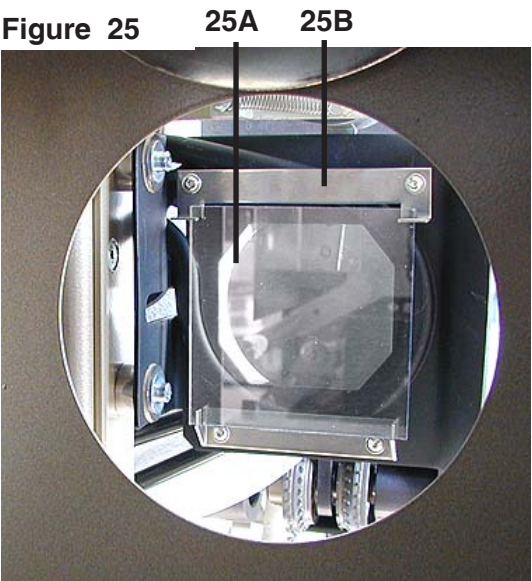
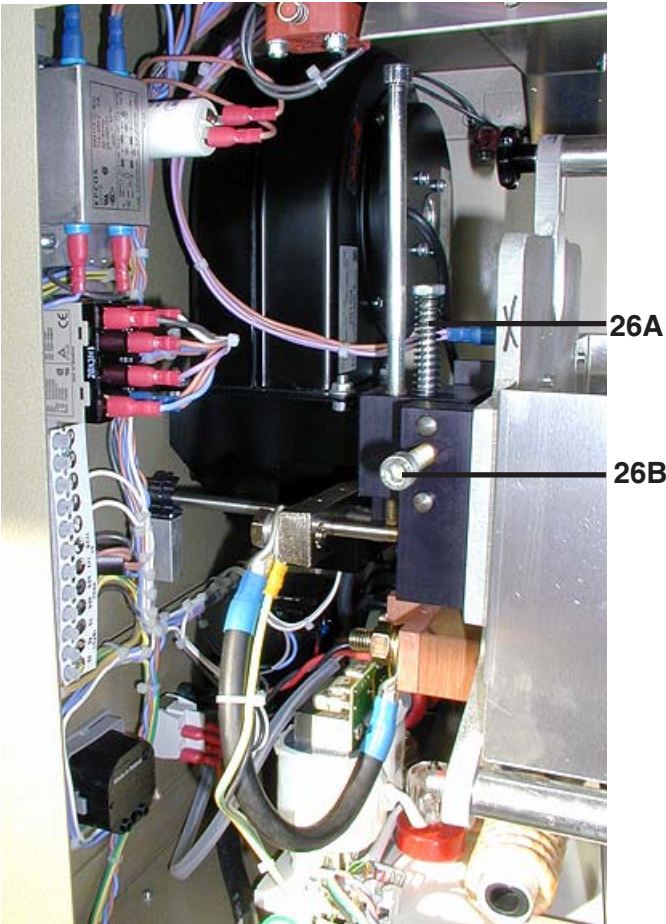


Figure 26





## 8 Technical Data, Circuit Diagrams and Plans of Terminal Connections

### 8.1 Technical Data

#### 8.1.1 Projector

Name	Film Projector
Type	FP 25 D with spool tower or spool rack
Machine No.	See data plate on the housing.

#### Connecting Data

Power supply	120 V / 230 V
Frequency	50 Hz / 60 Hz
External required over-current protection	10 A
Power max.	400 VA

#### Projector Head Power and Operating Data

Nominal rotary frequency of main drive motor	1500 rpm
Power of main drive motor	100 VA
Framing	± 1/2 frame manually or remotely

#### Spool Tower Power and Operating Data

Nom. rotary frequency of spool tower motor	1360 rpm
Power of spool tower motor	180 W
Reel speed max.	256 m/min
Nominal reel speed	190 m/min

#### Spool Rack Power and Operating Data

Nominal rotary frequency of friction motor	300 rpm
Power of friction motor	200 W
Reel speed max. (only with 2 friction motors)	150 m/min (with 5000 m spools)
Reel speed max. (only with 2 friction motors)	70 m/min (with 600 m spools)

**Sizes and Weights**

Components	Sizes	Weights
Projector with 5000 m spools with 4000 m spools	1737 mm x 1444 mm x 825 mm 1612 mm x 1444 mm x 825 mm	approx. 350 kg
Film reels	600 m / 1800 m / 2000 m / 4000 m / 5000 m	
Friction shafts	Ø 9 mm or Ø 12.7 mm	
Lens holder / turret	for lenses Ø 70.6 mm	
Apertures	1:1.37 / 1:1.66 / 1:2.35	

**8.1.2 Reverse-Scan Sound Device****Connecting Data**

Power supply	24 V
Frequency	50 Hz / 60 Hz
Power max.	6 W

**Power and Operating Data**

Frequency response	analog: 30 Hz - 16 kHz ± 1 dB digital: 20 Hz - 20 kHz ± 0.5 dB
Wow and flutter	≤ 0.1%

**8.1.3 Lamphouse**

Name	Universal Lamphouse
Type	1,000 W - 2,000 W or 2,000 W - 7,000 W
Machine No.	See data plate on housing

**Connecting data**

Mains Voltage	120 V / 230 V
Mains Frequency	50 Hz / 60 Hz
Pre-Fuse	6.3 A
Power Input	Depends on equipment

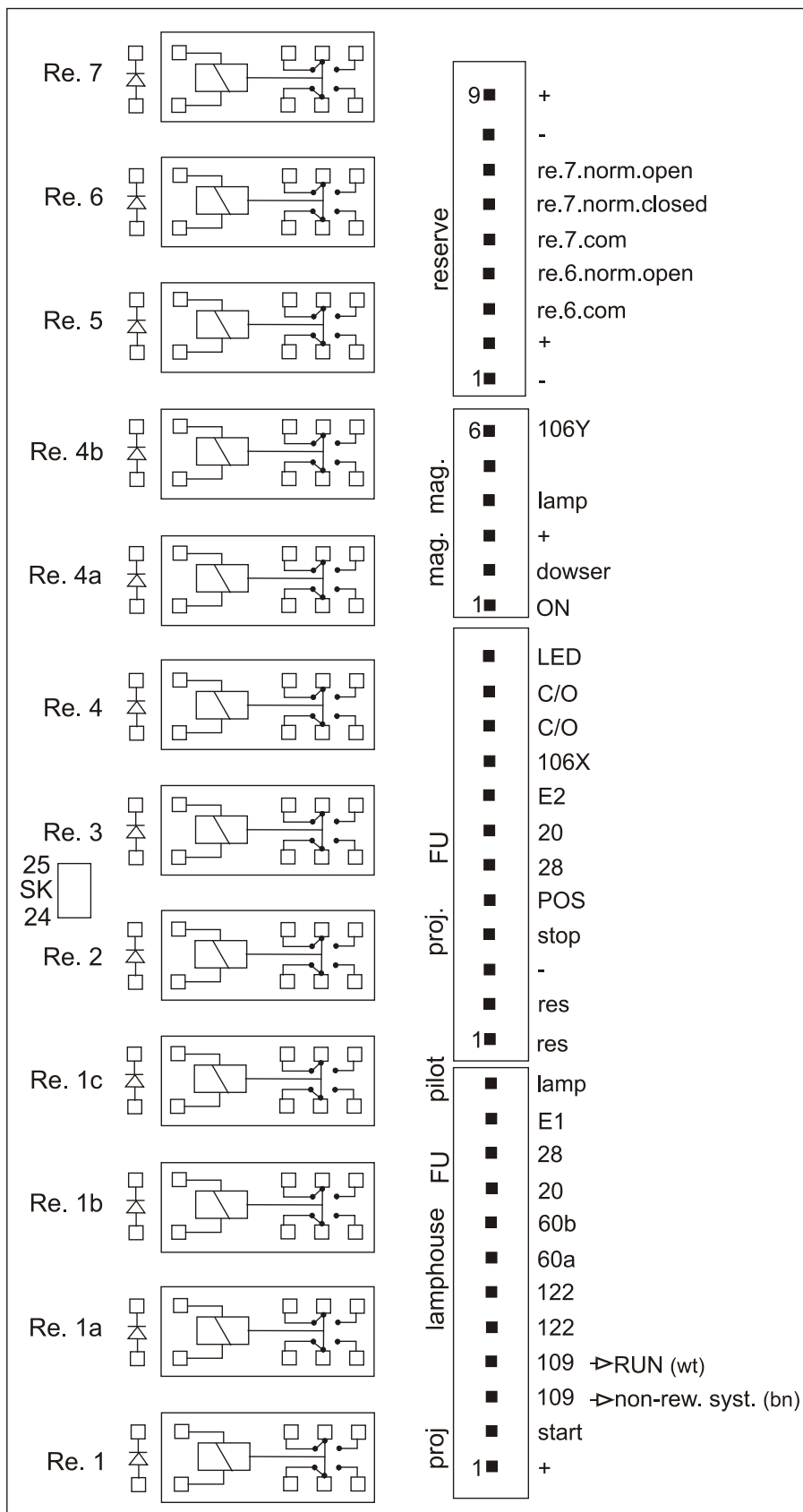
**Sizes and Weights**

Version / Components	Sizes	Weights
1,000 W - 2,000 W	655 mm x 400 mm x 490 mm	approx. 42 kg
2,000 W - 7,000 W	781 mm x 400 mm x 564 mm	approx. 64 kg
Reflector	Ø 300 mm or Ø 340 mm	

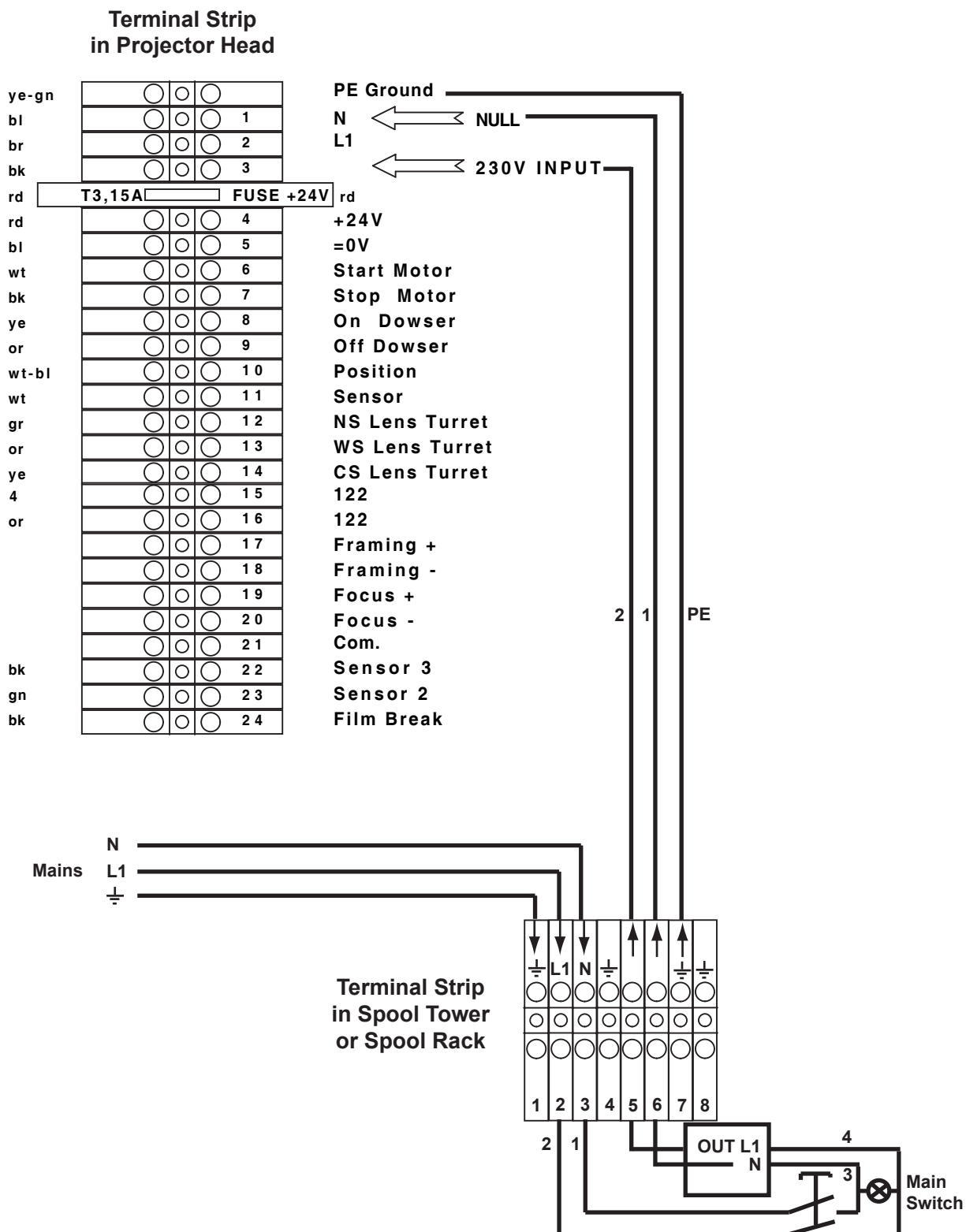


## 8.2 Plans of Terminal Connections

### 8.2.1 Main Control Board 8134-3



## 8.2.2 Main Terminal Strip in Projector Head, in Spool Tower or Spool Rack

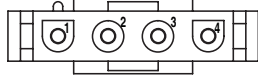


## 8.2.3 Plugs and Sockets Connections


Cable tree: Projector

Connector unit with sockets

- 1 = br
- 2 = gr
- 3 = wt
- 4 = ye/gn

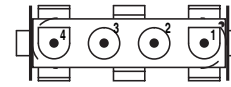


Plug A = Motor

- 1 = Motor V
- 2 = Motor U
- 3 = Motor W
- 4 = 

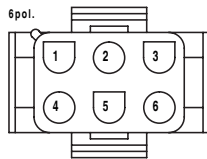
Cable tree: Head

Connector unit with plugs



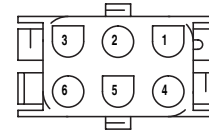
- 1 = ye/br
- 2 = rd/vi
- 3 = bl/gn
- 4 = ye/gn

- 1 = rd 0.25qmm
- 2 = gr 0.25qmm
- 3 = bl 0.25qmm
- 4 = ye 0.5 qmm
- 5 = gn 0.5 qmm
- 6 = wt 0.5 qmm



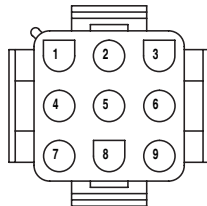
Plug B = Digital Sound Device  
(Option)

- 1 = +15V
- 2 = 0V
- 3 = -15V
- 4 = Digital LED
- 5 = Com.
- 6 = Analog LED



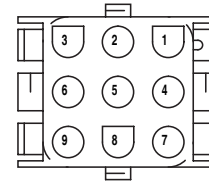
- 1 = rd 0.25qmm
- 2 = gr 0.25qmm
- 3 = bl 0.25qmm
- 4 = ye 0.5 qmm
- 5 = gn 0.5 qmm
- 6 = wt 0.5 qmm

- 1 = 1
- 2 = 2
- 3 = 3
- 4 = 4
- 5 = 5
- 6 = 6
- 7 = ye-gn
- 8 = bl
- 9 = br



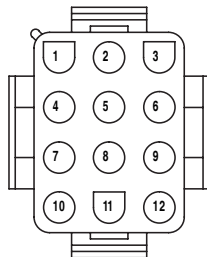
Plug C = Lamphouse  
(Option)

- 1 = 60
- 2 = 20
- 3 = 122
- 4 = 122
- 5 = 60A
- 6 = 60B
- 7 = PE
- 8 = 0V
- 9 = +24V



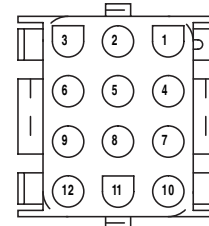
- 1 = 1
- 2 = 2
- 3 = 3
- 4 = 4
- 5 = 5
- 6 = 6
- 7 = ye-gn
- 8 = bl
- 9 = br

- 1 =
- 2 =
- 3 =
- 4 =
- 5 =
- 6 =
- 7 = br 0.25qmm
- 8 = bk 0.25qmm
- 9 = vi 0.25qmm
- 10 = gr 0.25qmm
- 11 = rd 0.5 qmm
- 12 = bl 0.5 qmm



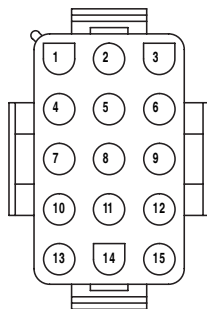
Plug E = Framing / Focus  
(Option)

- 1 =
- 2 =
- 3 =
- 4 =
- 5 =
- 6 =
- 7 = Framing +
- 8 = Framing -
- 9 = Focus +
- 10 = Focus -
- 11 = +24V
- 12 = 0V



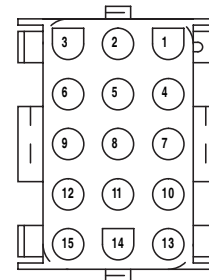
- 1 =
- 2 =
- 3 =
- 4 =
- 5 =
- 6 =
- 7 = br 0.25qmm
- 8 = bk 0.25qmm
- 9 = vi 0.25qmm
- 10 = gr 0.25qmm
- 11 = rd 0.5 qmm
- 12 = bl 0.5 qmm

- 1 = rd 0.5 qmm
- 2 = bl 0.5 qmm
- 3 = rs 0.5 qmm
- 4 = wt 0.5 qmm
- 5 = gr 0.5 qmm
- 6 = or 0.5 qmm
- 7 = ye 0.5 qmm
- 8 =
- 9 =
- 10 =
- 11 = gn
- 12 = bk
- 13 = vi 0.5 qmm
- 14 = bn 0.5 qmm
- 15 = wt/vi 0.5 qmm



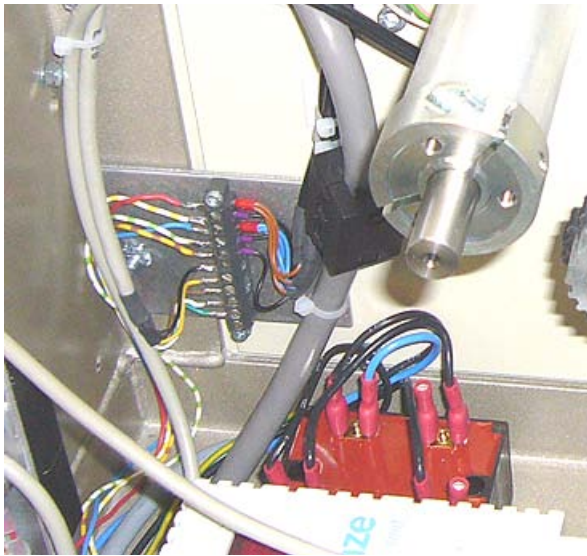
Plug D = Head

- 1 = +24V
- 2 = 0V
- 3 = Film Break
- 4 = Sensor 1
- 5 = NS Lens Turret
- 6 = WS Lens Turret
- 7 = CS Lens Turret
- 8 = NS Status
- 9 = WS Status
- 10 = CS Status
- 11 = Sensor 3 Auto Start
- 12 = Sensor 2
- 13 = Pilot lamp
- 14 = Dowser
- 15 = Position



- 1 = rd 0.5 qmm
- 2 = bl 0.5 qmm
- 3 = rs 0.5 qmm
- 4 = wt 0.5 qmm
- 5 = gr 0.5 qmm
- 6 = or 0.5 qmm
- 7 = ye 0.5 qmm
- 8 =
- 9 =
- 10 =
- 11 = gn
- 12 = bk
- 13 = vi 0.5 qmm
- 14 = bn 0.5 qmm
- 15 = wt/vi 0.5 qmm

#### 8.2.4 Sound Output on 8-pole Terminal Strip



solar cell connection

solar cell connection

solar cell connection

shield

sound output left - (yellow)

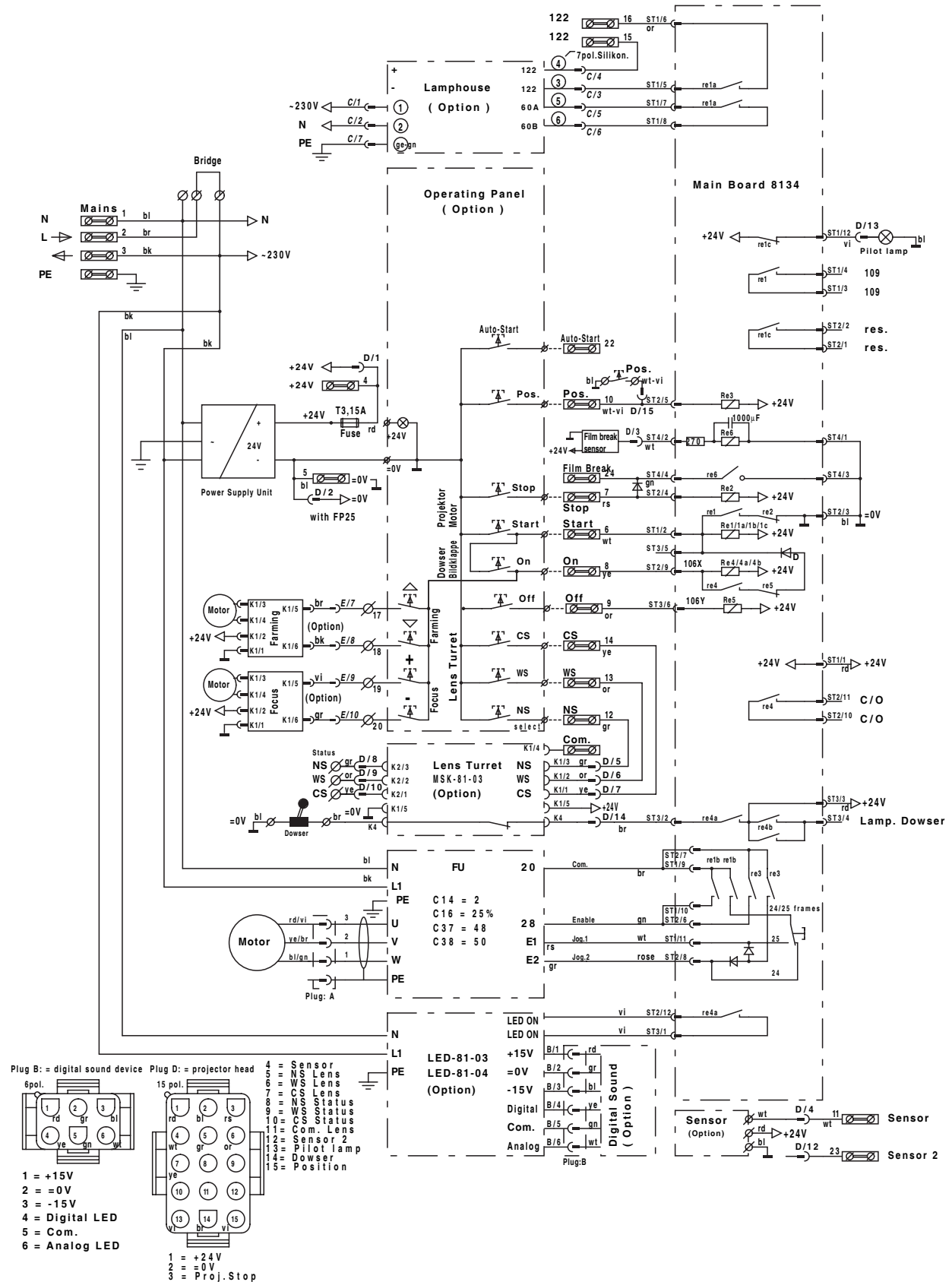
sound output left + (brown)

sound output right - (white)

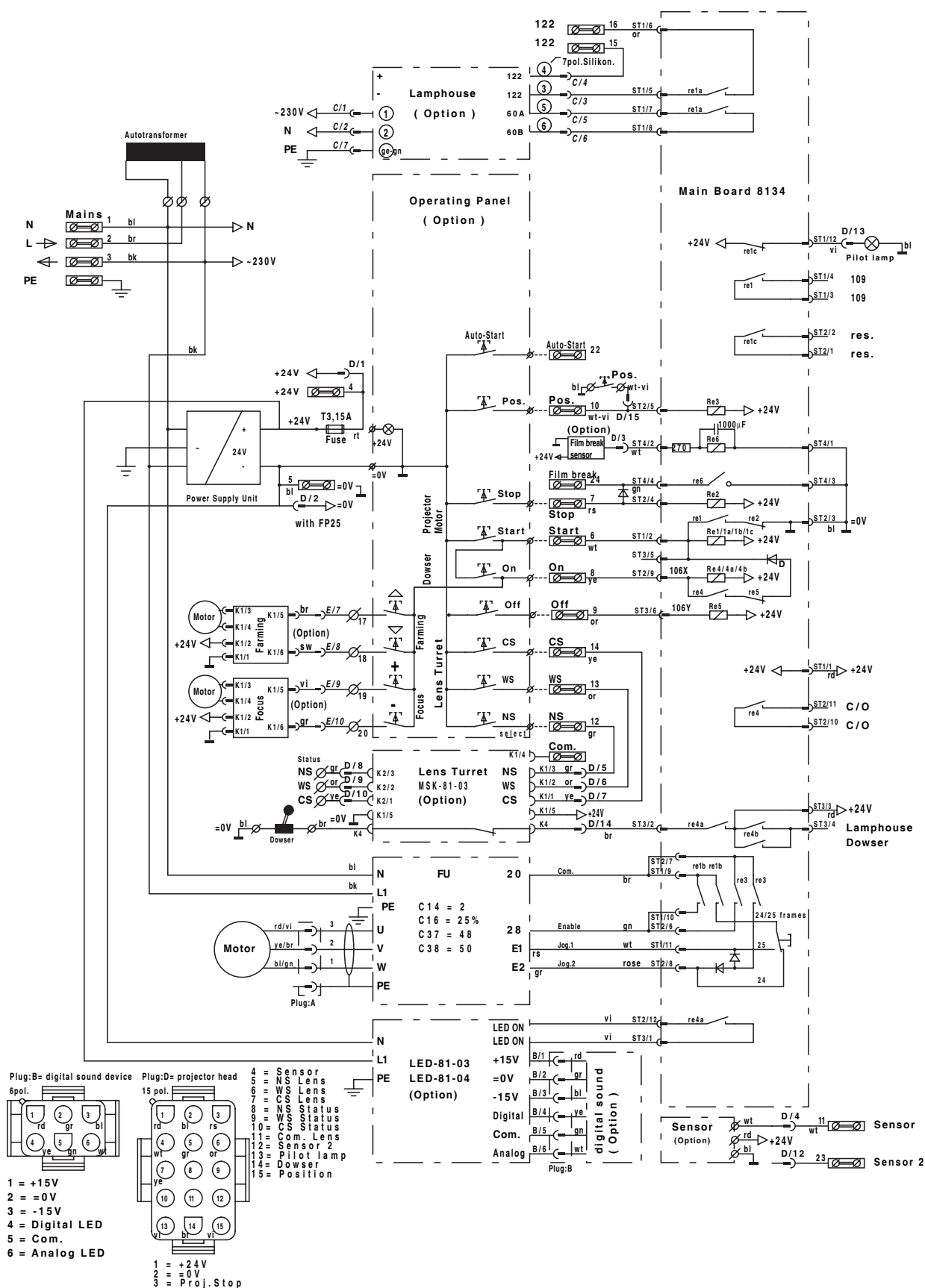
sound output right + (green)

## 8.3 Circuit Diagrams

### 8.3.1 FP 25 D on 230 V Mains Connection



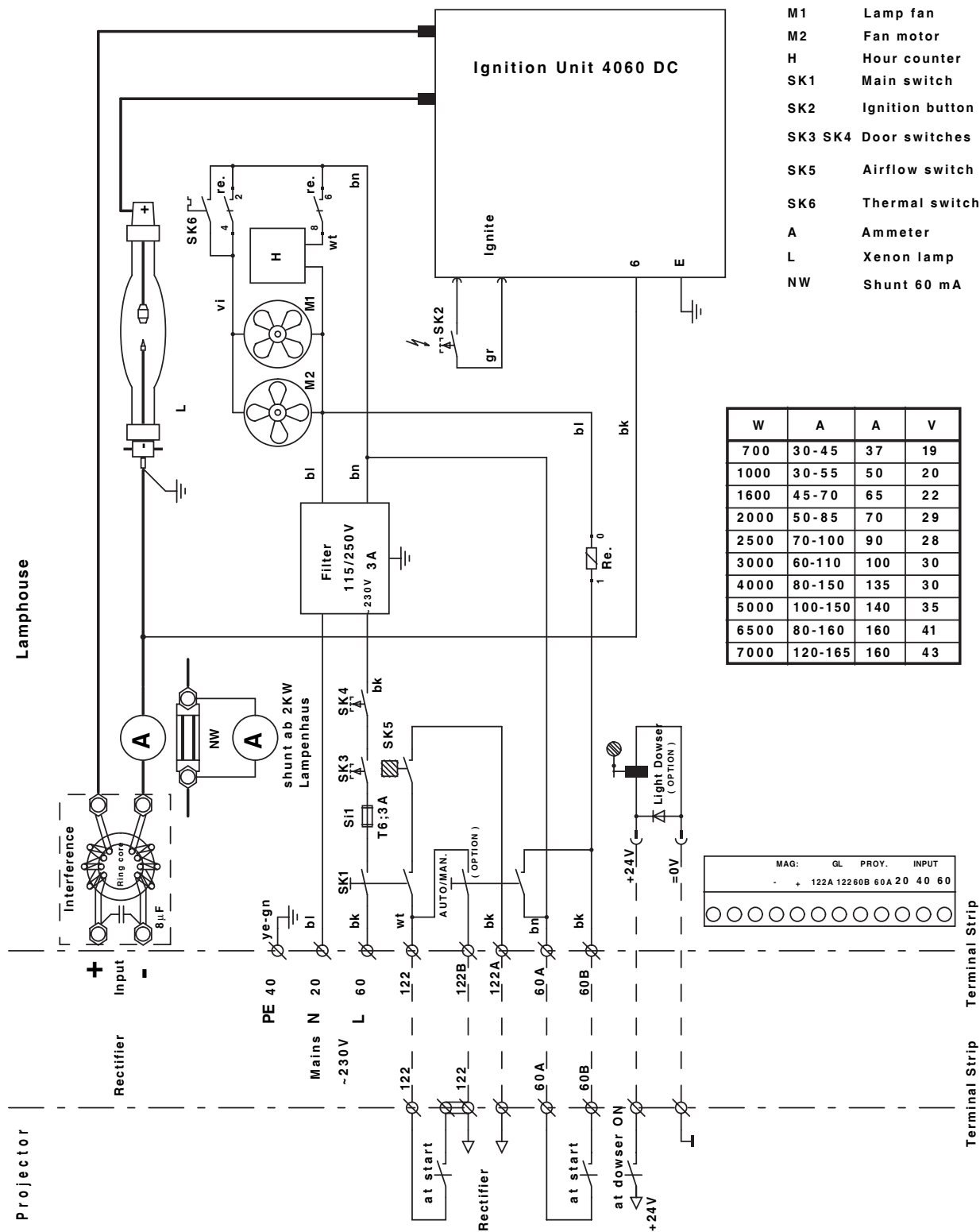
## 8.3.2 FP 25 D on 120 V Mains Connection (USA)



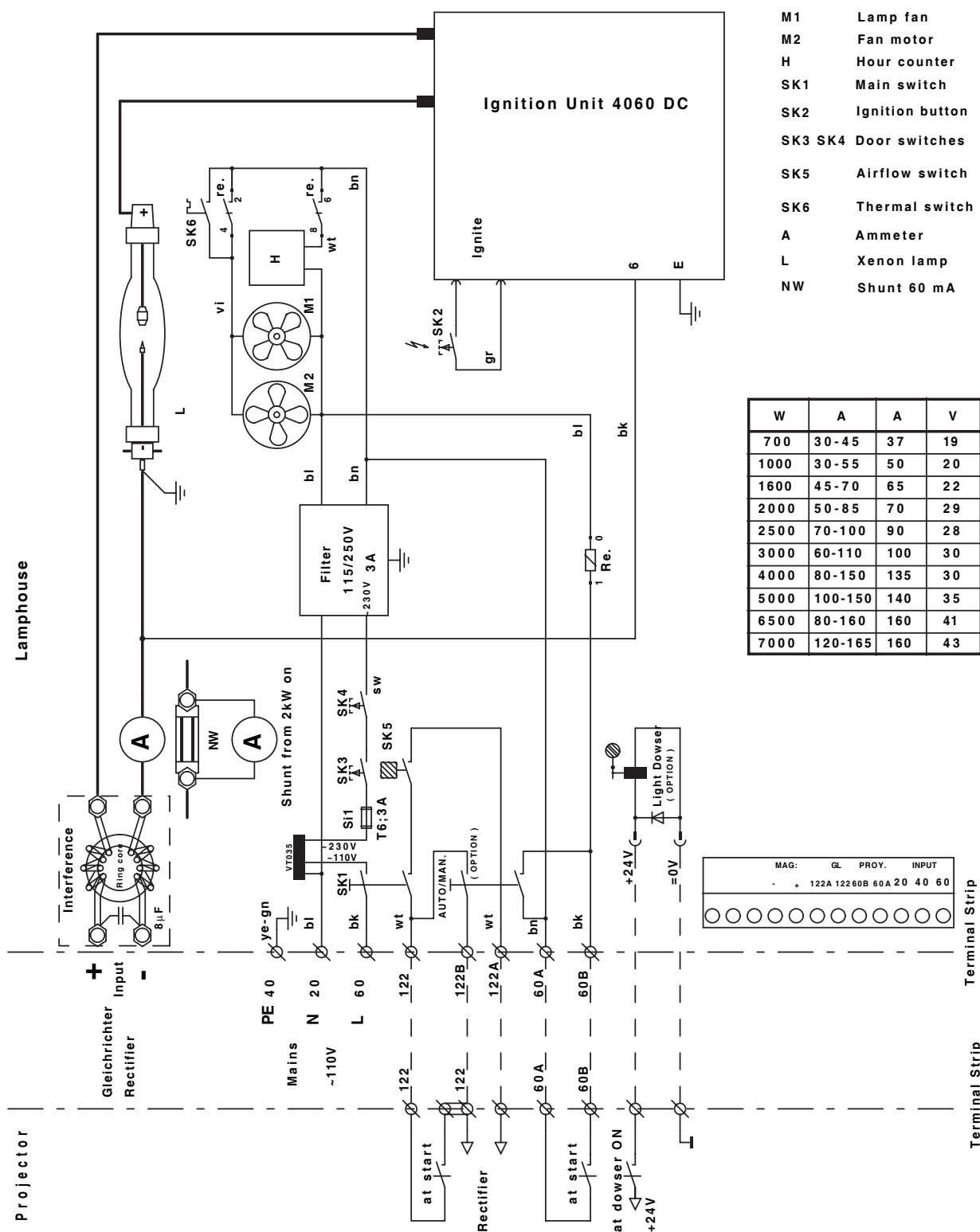


### 8.3.3 Lamphouse

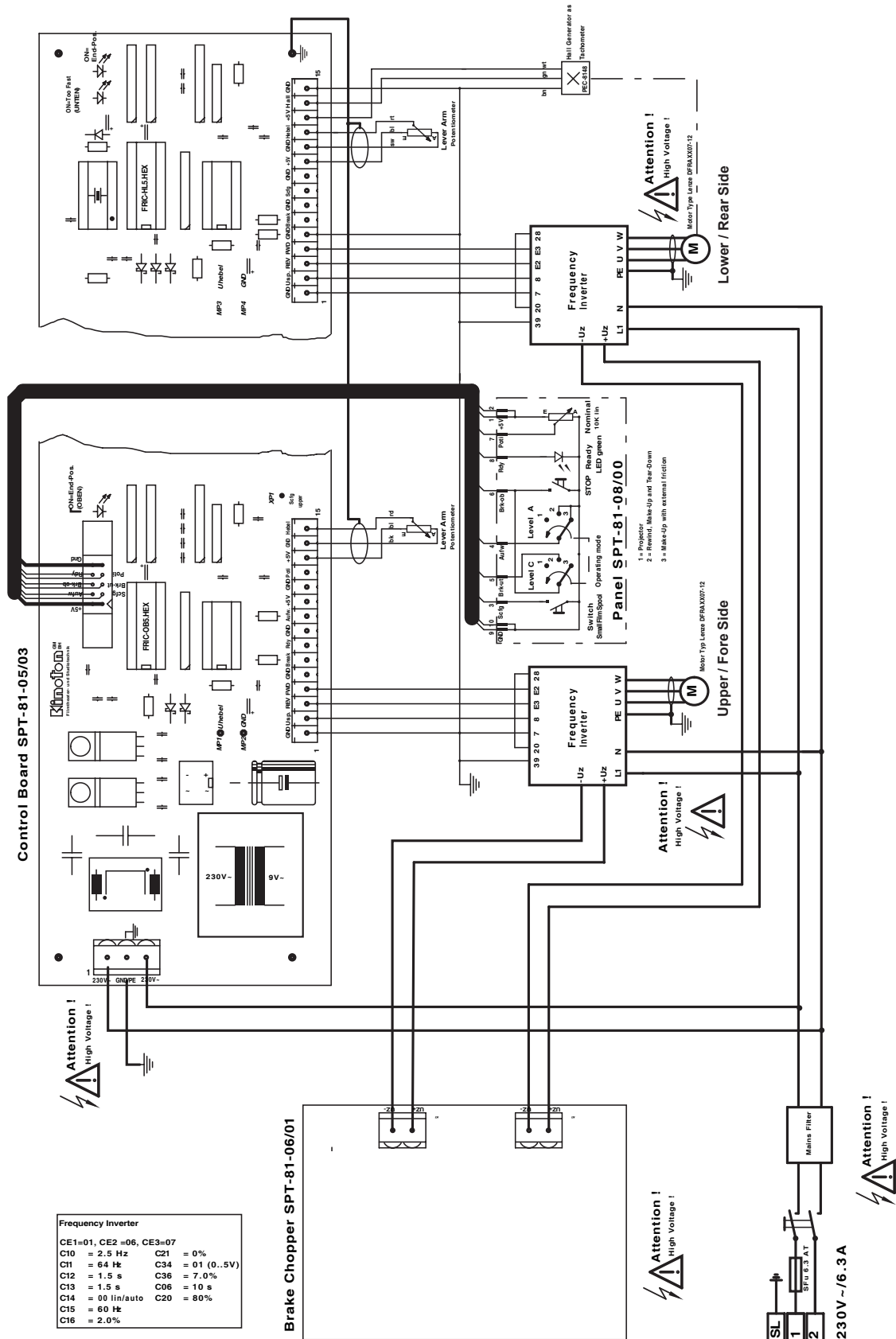
#### 230 V Mains Connection



## 120 V Mains Connection



### 8.3.4 Spool Tower





## EC Declaration of Conformity

Company name	<b>Kinoton GmbH</b>
Address:	Industriestr. 20a, D-82110 Germering
Machine designation:	Cinema Projector
Machine type:	<b>FP 25 D</b>
Maschine serial number:	Q0492

### Relevant EC stipulations:

<b>Machine regulation</b>	<b>2006/42/EG</b>
<b>Low Voltage regulation</b>	<b>2006/95/EG</b>
<b>EMC regulation</b>	<b>2004/108/EG</b>

### **Standards:**

if need be harmonized standards      EN 61000-6-1, EN 61000-6-2  
EN 55022/A1, EN 55022

if need be national standards

and technical specifications

**the above-named machine is developed, constructed and manufactured in accordance with above-listed EC regulations and in sole responsibility of**

**Company: Kinoton GmbH**  
**Industriestr. 20a**  
**Germany 82110 Germering**

Place, date:      Germering, 11. 01. 2010

Signature:



Prenome, name:      Herbert Zipfel

Function:      Production Manager